

Farm Chemicals

Pioneer Journal
of the Industry

Mo's New

Facilities 32

Molybdenum

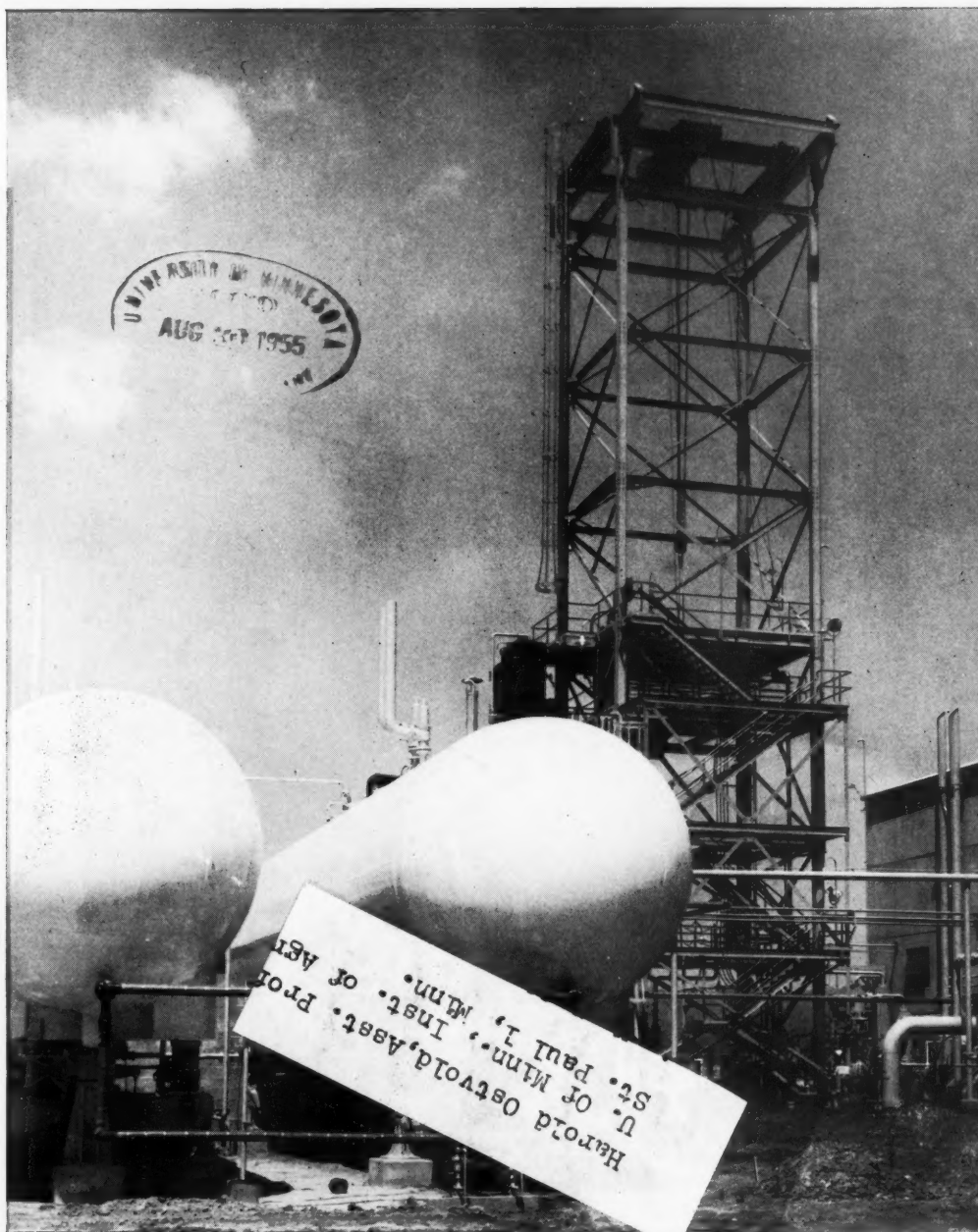
Outlook 46

Tolerances

Extended 50

Press Grades

Problem 39



International's New Triple Superphosphate assures more **complete ammoniation**

ONE look shows you why International's new Triple Superphosphate offers such a big advantage in ammoniation. Its improved fineness of texture; uniform, dust-free particles; and correct chemical structure assure maximum ammoniation in minimum time — help cut your manufacturing costs. International's new Triple Super is made by an improved process from high quality rock. Result: a high analysis product

(46% A.P.A. or better). Special conditioning before shipment helps prevent setting up en route. This, plus improved particle size, means less grinding before mixing, more economical handling, better texture in your finished products and high product performance. International's new Triple Super is ready for immediate delivery to your plant. Write or wire the Phosphate Chemicals Division for samples and quotations.



INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6



**ANOTHER UNION BAG CONTRIBUTION TO
BETTER PACKAGING IN MULTIWALL BAGS**

SPEED was what this warehousing-stevedoring operation wanted. With the necessity for bagging in Multiwalls as material was unloaded from ships, the company had a definite peak-load problem.

After a plant survey, Union packaging engineers recommended a modernized system built around Union's efficient new I & C Baggers. This Multi-wall user is now filling and closing better than 20 bags a minute, an ideal rate for his needs.

Can your own Multiwall packaging operation stand improvement? Union's diversified experience can help you.

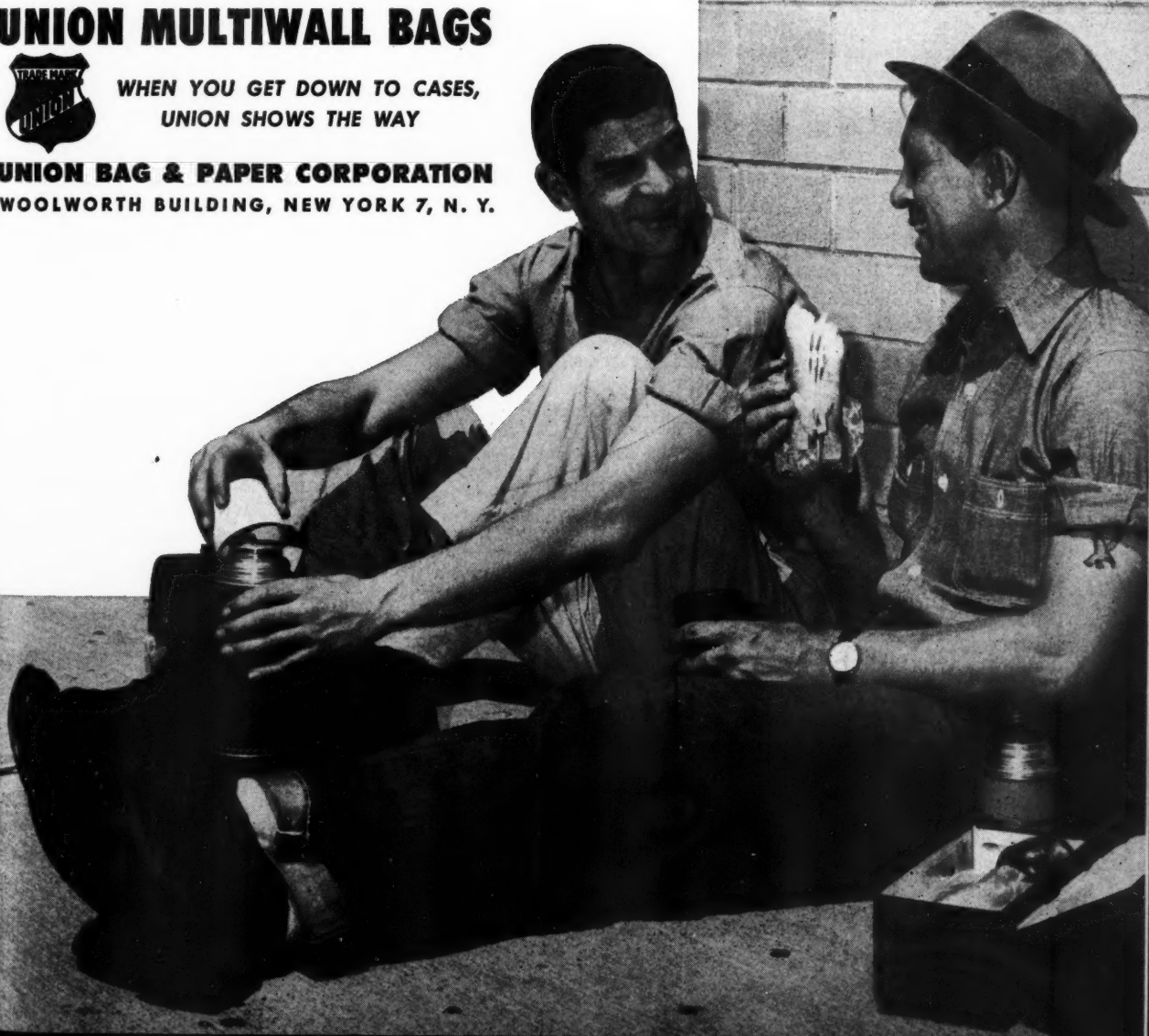
UNION MULTIWALL BAGS



**WHEN YOU GET DOWN TO CASES,
UNION SHOWS THE WAY**

UNION BAG & PAPER CORPORATION
WOOLWORTH BUILDING, NEW YORK 7, N. Y.

**You gotta hand it
to that new Union
bagging machine...
Now they can unload
the ships as fast as
they want to...**



Farm Chemicals

AUGUST, 1955

No. 8
Vol. 118

Pioneer Journal of Farm Chemicals Industry, Est. 1894

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San Francisco 4. William Blair Smith, Russ Building.....	EXbrook 2-3723



Member

Business Publications Audit

Published monthly by Ware Bros. Company, 317 N. Broad St., Philadelphia 7, Pa.
Telephone MArket 7-3405

Acceptance under Section 34.64 P. L. & R., authorized

In this issue . . .

All manufacturers will find of value H. B. DeVinney's discussion of Davison's plant committee idea which begins on page 42. Work stoppages and industrial relations have been graphically affected by this prize-winning program. If you're experiencing labor difficulties—don't fail to read it.

On the pesticide front, the big news is extension of FDA tolerances, a change in the regulatory fee set-up and the appointment of a 14 man committee on enforcement. George Peters provides the round-up beginning on page 50.

Of special interest to fertilizer producers is the complete description of Ark-Mo Plant Food co.'s new granulation factory. Trial runs have already produced 14-14-14 goods with all N from 37 per cent nitrogen solution, and data will be developed on grades with ratios such as 1-4-4! See the story on page 32.

We have tried, on page 45, to bring you new information on the use of molybdenum as a plant food, the current U.S. picture and outlook.

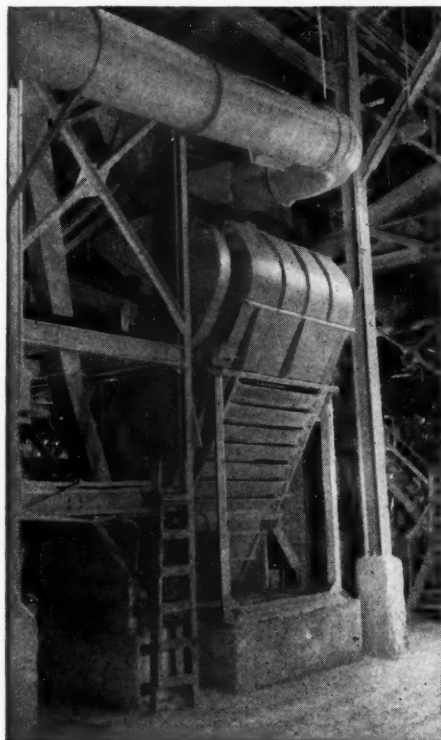
Also in this issue: some ideas (page 39) on how to reduce excess number of fertilizer grades; Merck's new antibiotic spray compound (page 41), a streptomycin-glycerine combination; and a short on Heckathorn & co. activities in supplying formulations for forest and range pest control. (page 52)

Cover story

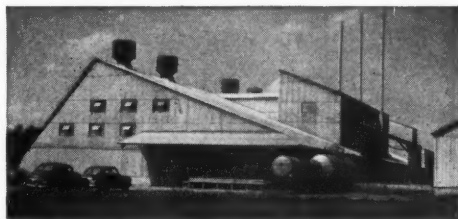
Shipments of anhydrous ammonia have begun at Columbia-Southern Chem. co.'s new Natrium, W. Va., facilities. Pictured are weigh tanks in left foreground, each holding 100 tons of NH₃, converter tower in the center and a portion of the compressor building on the right.

FARM CHEMICALS

Need processing, transmission or conveying equipment ... counsel ... or a complete fertilizer plant? Get any or all from **LINK-BELT**



50% more production resulted at Iowa Farm Supply Co., Des Moines, through the aid of Link-Belt engineering counsel. Link-Belt equipment here includes Multi-Louvre Cooler (left), Roto-Louvre Dryer (below), bucket elevator, vibrating screens and power transmission machinery.



Here's how you can produce higher grade fertilizer ... at lower cost

THIS plant demonstrates what can be accomplished with the right choice of dependable equipment plus sound engineering methods. And you can count on Link-Belt for similar high efficiency—with needs ranging from a complete plant to a few pieces of equipment.

Link-Belt can accept total responsibility for design, equipment

and erection of complete, modern fertilizer plants under a single contract. Qualifications include a broad line of quality handling and processing equipment ... plus experience with dry-mix, superphosphate, nitrophosphate, ammonium nitrate, ammonium sulphate, urea, granulation and other plants.

Call your nearest Link-Belt office for an analysis of your require-

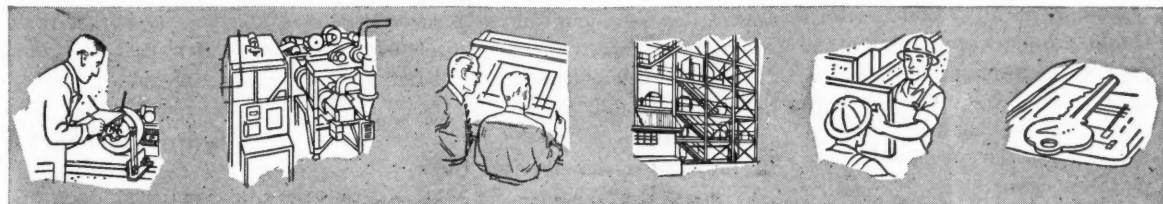
ments, however large or small. Our engineers will work directly with you or your consultants ... help you produce better fertilizer at lower cost. Write today for a copy of Book No. 2459.



CONVEYING AND PROCESSING EQUIPMENT

Here's what Link-Belt offers you under a single-contract responsibility

13,085



**MODERN
LABORATORIES**

**PILOT AND
TESTING STATION**

**EXPERIENCED
ENGINEERING**

**QUALITY
EQUIPMENT**

**SKILLED
ERECTION CREWS**

**SATISFACTORY
PERFORMANCE**

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

AUGUST, 1955

3

Business & Management

... News of the Industry

Lion Oil, Monsanto Agree on Merger

Another integration of major farm chemicals producers is in the news this month as Monsanto Chemical co. and Lion Oil co. sign an agreement merging Lion with and into Monsanto. Basis of the combination, if approved by stockholders at meetings on September 23, will be issuance of one and one half shares of Monsanto \$2.00 par value common stock for each outstanding share of Lion.

T. M. Martin, Lion president, commented that both firms believe "this union will hasten a long range program of producing an increasing variety of chemical raw materials." Major considerations cited by Martin include:

1. Belief that substantial markets for solid and liquid forms of high NP fertilizers are growing. Lion is a large low-cost producer of nitrogen materials—Monsanto and its allied companies are substantial consumers of ammonia—Monsanto is a large phosphorus producer and has developed methods of combining phosphorus with ammonia for plant food uses.

2. Monsanto herbicides and other farm chemicals will complement Lion activities.

3. A large part of Monsanto's raw materials are products which can be or are produced from petroleum fractions or natural gas. Lion has an excellent oil producing, refining and distributing organization, successful exploration department.

If the merger is approved, identity of Lion will be continued as Lion Oil co., a division of

Monsanto Chemical co. with Martin as division president. He and T. H. Barto would become Monsanto board members. The effective date would be September 30.

Thunderbird Plans Arizona Fert. Unit

A new source of nitrogen and phosphate in the Southwest, Thunderbird Chemicals, Inc., is expected to be in production by the fall of 1956. The facilities will be erected at Kyrene, near Phoenix, Ariz., with construction supervised by Ebasco Services, Inc., at an estimated cost of over \$10 million.

A variety of products will be manufactured including 120 tons per day of anhydrous ammonia, 150 tons ammonium sulfate, 50 tons ammonium phosphate, 45 tons urea, 30 tons fertilizer solutions and 170 tons sulfuric acid. Part of the acid will be used in wet process acidulation of western phosphate rock.

Fred Shanaman, Pennsalt of Washington president, heads the new concern.

Pennsalt Offices To New Location

Executive offices of Pennsylvania Salt Mfg. company and its operating divisions have been moved to Three Penn Center Plaza, Philadelphia 2, Pa. The telephone number remains the same—LOcust 4-4700.

Included in the move are these divisions: I. P. Thomas, Sharples Chemicals, Chemical Specialties, Industrial Chemicals and Pennsalt International.

Fire Hits Superior Fert. & Chem. Plant

One of the worst fires in Tampa, Fla. history, from a personnel standpoint, occurred on July 1 when a half million dollar conflagration hit the Superior Fertilizer & Chemical plant. Caused by lightning, wind whipped flames roared through two large buildings and stocks of technical and formulated parathion, sulfur, DN and other chemicals.

G. Dexter Sloan, president of the firm, warned the fire chief that gas masks should be used because of the parathion hazard and he attempted to move a crowd of spectators from the immediate area as a shift in the wind blew heavy fumes into its midst. After reviewing the damage, Sloan said that all insecticide blending and bagging facilities were lost and the grinding equipment was probably warped beyond use.

An adjoining fertilizer plant and warehouse were saved and firemen were able to keep tanks of oil in the insecticide plant from exploding.

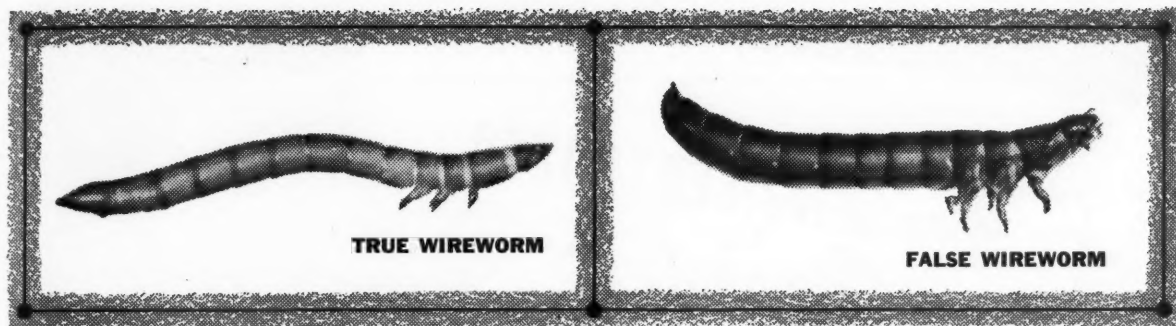
Twenty-two firemen received treatment for fumes inhaled while fighting the blaze but only three of the 10 hospitalized were victims of parathion poisoning. The most seriously affected of these was in fair condition at last report. Most of the others were affected by fumes from sulfur dioxide and other chemicals.

Tampa chemical firms are now required to give the city fire department a list of all dangerous chemicals on hand so firemen can take necessary precautions when fighting a blaze.

Ark-Mo Purchases Blytheville Plant

Blytheville Fertilizer corp.'s plant at Blytheville, Ark., recently was purchased by Ark-Mo Plant Food co.

FARM CHEMICALS



PROTECT WHEAT SEED FROM WIREWORMS...

with a single **dieldrin**
seed treatment

**Farmers can treat seed now
...plant later...**

**dieldrin safeguards seeds...
does not affect germination**

FARMERS CAN BE SURE of a better stand of wheat by planting dieldrin-treated seed. A single treatment with dieldrin protects wheat and other small grains from true and false wireworms, rootworms, ants, and other soil insects, without affecting seed germination or root growth.

Low-cost protection

Two to four ounces of actual dieldrin treats 100 pounds of seed . . . costs just pennies per acre. A dieldrin seed treatment prevents "spotty" stands caused by soil-insect damage . . . eliminates re-seeding.

Less work at planting time

Growers now can avoid the rush of treating seed and planting within a few days. They can treat now with powerful, long-lasting dieldrin —then store seed until planting time.

Compatible with fungicides

Dieldrin is compatible with fungicides . . . can be applied at the same time to save the expense and work of a double treatment. Dieldrin can be used as a slurry, dry, or in a grain drill. Follow directions on the label.

Build sales and profits with dieldrin seed treatment

Timely national advertising is pre-selling farmers on the benefits of dieldrin seed treatment. Make extra profits this season . . . sell dieldrin for seed treatment. Write for additional technical information.

SHELL CHEMICAL CORPORATION

AGRICULTURAL CHEMICALS DIVISION

460 Park Avenue, New York 22, New York



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Mineralized FERTILIZER

MADE *Easier* THAN
"DO IT YOURSELF"

WITH



Custom-Formulated MINERAL MIXTURES



With **Tennessee's Custom-Formulated Mineral Mixtures** there is only one ingredient to add to your regular fertilizer to have a completely balanced plant food. No additional labor or mixing facilities. We custom-mix any combination of minerals to your own specifications. **Tennessee's Custom-Formulated Mineral Mixtures** come to your plant in bulk or bag already carefully mixed in controlled amounts of soluble, readily available forms of Copper, Manganese, Iron, Zinc, Magnesium and Boron. You cut down on raw material cost, number of items purchased and handling time with **Tennessee's Custom-Formulated Mineral Mixtures**.

Samples,
specifications and
detailed information
upon request —

TENNESSEE  CORPORATION

617-629 Grant Building, Atlanta, Georgia

FARM CHEMICALS

. . . Business & Management

Coronet First With Strike Settlement

ONE 'break in the strike deadlock in Florida's phosphate rock fields came during late July as Coronet Phosphate co. and the International Chemical Workers Union (AFL) came to terms. The strike, involving 3,100 workers, began June 1 and involves seven companies in addition to Coronet.

Still strike bound as we go to press are American Agricultural Chemical co., American Cyanamid co., Armour Fertilizer Works, F. S. Royster Guano co., Swift & co. and Virginia-Carolina Chemical corp.

Scattered incidents have occurred, the first on June 21 when a striker was shot in the leg by a deputy who was then beaten by pickets at the Coronet facilities. An International Minerals & Chem. corp. truck and two private cars were hit by shotgun blasts as they sat in the yards of International supervisory employees. At picket lines near International installations, some 50 tires have been punctured on cars of company personnel.

The union struck for an increase of $8\frac{1}{2}$ cents in wages and benefits when industry offered about 4.4 cents. In mid-July demands at the Armour plant were nearly doubled as union officials took note of increases in the steel and automobile industries. When their demands were boosted to a 15 cent package, Armour withdrew its previous offer of 3.5 to 4 cents.

The Coronet settlement, a two year contract, includes these concessions:

6-8 cents/hour increase in phosphate division

29-33 cents/hour increase in deflourinating plant

AUGUST, 1955

1 cent increase in shift differentials

guaranteed work week for employes on a Tuesday through Saturday shift

4 cents/hour increase on May 15, 1956

non-contributory pension plan
2nd shift differential upped from 4 to 5 cents/hour

3rd shift differential upped from 6 to 10 cents/hour

The union had sought a package plan totaling about 10 cents per hour without a reduction in the work week.

Some of the employees, maintenance workers, went back to work immediately, but mining operations were not expected to begin until August 1.

At the time International supervisors were plagued with nails and shot-gun pellets, F. B. Bowen, rock division manager, and William Bellano, chemical division head, were mailing letters to the 1,000 striking employees urging rapid settlement of the dispute.

Both pointed out that a package increase had been offered which was generally in line with or exceeding rates for similar jobs already accepted by the union. This included an increase of about eight cents per hour effective May 15, upping the second shift differential from four to five cents and the third shift from six to 10 cents, plus automatic raises of four cents on May 15, 1956 and May 15, 1957.

Davison Chemical co. operations continued to function under a contract that still has a year to run.

A sharp slowdown of traffic at the port of Tampa was noted as a result of idleness in the phosphate fields. About 90 per cent of outgoing tonnage is made up of rock shipments.

SE Wash. Site for Phillips Pacific Unit

Phillips Petroleum co. and Pacific Northwest Pipeline corp. have joined to form a new West Coast nitrogen operation, Phillips Pacific Chemical co. The initial unit of the new plant, to be located in southeastern Washington, will produce 200 tons daily of anhydrous ammonia.

Plans for the facilities, aimed at serving growing fertilizer demands in the Intermountain, Inland Empire and Pacific Northwest regions, were made possible through current construction by PNP of a long-distance transmission line which will bring the first natural gas in to the area.

Facilities will be designed by Phillips Chemical and constructed by Fish Engineering corp. with scheduled completion set for late 1956—in time for the 1957 spring season.

Representing the first new industry in the area resulting from availability of natural gas, the initial ammonia unit will use 15 million cubic feet of the raw material per day.

Versenes Absorbed

Versenes, Inc. purchased by Dow Chemical co. last fall and since operated as a subsidiary has been absorbed by the parent company. Sales and development headquarters have been transferred to Midland, Mich., and facilities for production of chelating agents will remain at Framingham, Mass.

New CFF Offices

On Sept. 1, Central Farmers Fertilizer co. will move to Room 1923, 205 West Wacker Drive, Chicago 6, Ill.

. . . Business & Management

El Paso Concern Bought by K. B. Ivy

K. B. Ivy, prominent El Paso cotton farmer, has purchased the interests of Robert, B. J., Ralph and Donald Kerley in Southwest Fertilizer & Chemical co., El Paso, Tex.

With assets valued at nearly three-quarters of a million dollars, the company has branches at Odessa, Pecos, Clint and Lubbock, Texas, and Anthony, N. M., manufacturing fertilizers at its El Paso plant and formulating insecticides at Odessa.

It distributes throughout west Texas, N.M., Ariz. and northern Mexico and also operates Southwest Flying Service, Pecos, with Jim Guest as manager.

W. G. Nelson will continue as general manager and other officials announced by Ivy include N. D. MacAllister, sales manager; W. W. Houghton, credit manager; B. M. Luttrell, manager, El Paso plant; Jack Humberson, Odessa plant manager; C. M. Wesson, Pecos office manager; Ted Flint, Clint office manager; Alton Bailey, Anthony office manager; and B. M. Steele, Lubbock manager.

Charleston Fire

Warehouses of Tidewater Terminals, off East Bay St., Charleston, S. C., were destroyed by fire on June 17. Loss is expected to have exceeded \$1 million.

New Law to Permit Texas City Suits

According to legislation recently passed by the Senate, suits for damages against the United States resulting from the Texas City, Tex., ammonium nitrate explosion in 1947, can be filed. Approval of the House was anticipated.

Jurisdiction would be conferred

on the U.S. District Court for the Texas southern district for judgement on property and personal damages. Appeals from judgement of the court can be made only on extent of damages, not on liability of the Government.

The court is directed, by the bill, to set up special rules of procedure for handling suits within 60 days. Claimants must file suits within six months.

O-M Ammo-Phos Promotion Launched

This season, Olin Mathieson Chemical corporation embarked on its biggest Ammo-Phos fertilizer promotion campaign using magazine and newspaper ads, billboards, publicity, radio, TV, literature and direct mail and point of sale displays. Advertising is concentrated on an AP (Ammo-Phos) theme using the trade mark and phrases such as Added Profits, Available Phosphorus, Advance Protection, Ammonia Products and Agricultural Program.

Fertilizer dealers handling AP high analysis plant foods are provided with the novel "do-it-yourself" display pictured here. Two plastic bottles for water plus samples of Ammo-Phos and an ordinary fertilizer are used to attract prospective customers who spoon a sample of each fertilizer into the bottle to see and test water-solubility.

Directing the campaign is Charles J. Murphy, in charge of Olin Mathieson agricultural chemical advertising, working with the Doyle, Kitchen and McCormick agency.

Two plastic bottles for water plus Ammo-Phos and ordinary fertilizer samples are used in the display.

House Orders TVA Phosphate Cut-back

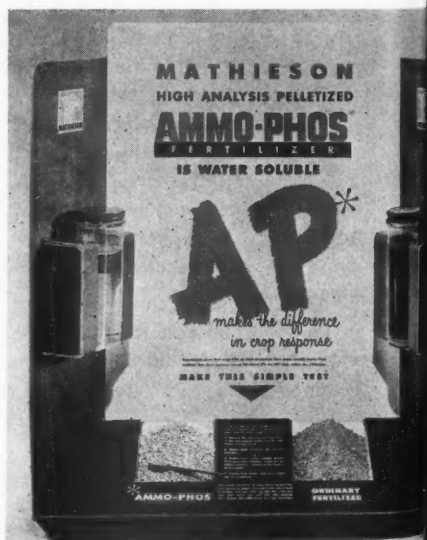
TVA last month was ordered by the House Appropriations committee to cut back its diammonium phosphate production plans for next year to a maximum of 5,000 tons.

The committee said in a report to the house that because industry has "indicated a willingness to expand production . . . most of the objectives sought by TVA in getting wider availability and use of the product will be accomplished."

Hamm Co. Facilities Purchased by AAC

The American Agricultural Chemical co. has purchased The Hamm co. from the estate of the late Valdo R. McCoy. This plant, at Washington Court House, Ohio, becomes AAC's 29th fertilizer factory.

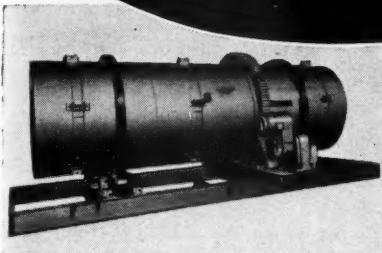
Starting immediately, changes and improvements are being made in the factory and equipment. When manufacturing operations are resumed, AAC reports the plant will produce Agrico and AA Quality Fertilizers for the coming Fall season.



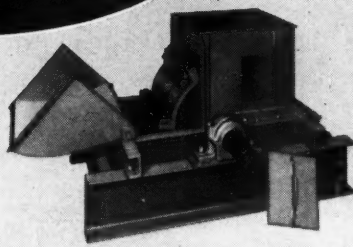
FARM CHEMICALS

STURTEVANT FERTILIZER EQUIPMENT

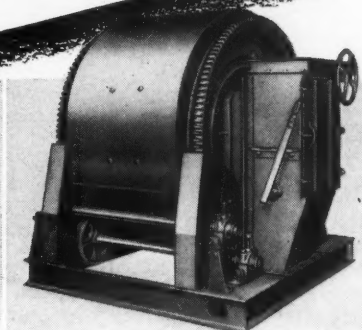
CUTS
Cost of Fertilizer
Manufacture



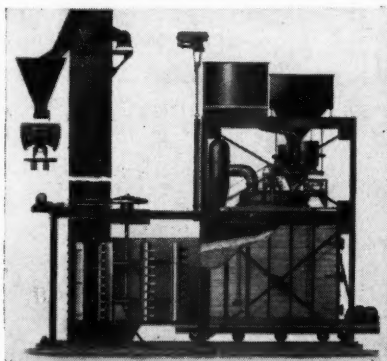
STURTEVANT FERTILIZER GRANULATING UNITS provide you with a complete process for manufacturing granular fertilizer. These efficient units can be supplied for various hourly tonnages and certain granule sizes depending on your particular requirements.



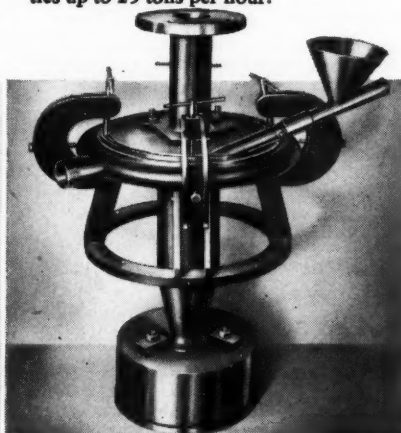
TAILINGS ROTARY PULVERIZER — increases output of fertilizer tailings . . . will not clog . . . leaves no daily accumulation of unground pellets. Capacities up to 25 tons per hour.



DRY BATCH MIXERS — 4-way mixing action mixes two or more ingredients into an inseparable, homogeneous blend. Open door accessibility makes cleaning easy. Capacities $\frac{1}{4}$ ton to 2 tons.



DEN AND EXCAVATOR — speeds processing of superphosphates. Easily operated by two men . . . produces 16 to 40 tons per batch and up to 480 tons per day of superior fertilizer free from lumps.



MICRONIZER® GRINDING MACHINE — A fluid jet grinding machine, the Sturtevant Micronizer speeds reduction of materials to low micron sizes. These jet mills are especially applicable in fields where a particle size in microns is desired.



MOTO-VIBRO SCREENS — screen everything screenable. Open and closed models with or without feeders. Many types and sizes . . . screens from $\frac{1}{8}$ " to 60 mesh.

For over 72 years, the Sturtevant Mill Company has been a leader in the design of plants and manufacture of fertilizer equipment. Equipment that has cut costs, increased tonnage throughout the industry.

Whether you plan to build a new plant, modernize or buy new equipment, it will pay you to consult Sturtevant Mill. Our engineers, specialists in fertilizer manufacture, are available for consultation. Ask for their services, today. You will keep ahead with Sturtevant.

AUGUST, 1935

STURTEVANT MILL COMPANY

132 CLAYTON STREET
BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of:
CRUSHERS • GRINDERS
SEPARATORS • CONVEYORS
MECHANICAL DENS and EXCAVATORS
ELEVATORS • MIXERS

. . . Business & Management

On the Safety Front



M. W. Mawhinney, Smith-Douglass co.'s Albert Lea, Minn., branch manager, points with pride to the sign which hangs outside the plant, showing that the unit had worked 1,261 days on June 21 without a lost time accident. The last disabling accident at Albert Lea was on Jan. 7, 1952, and since then the plant has worked 350,000 manhours, the firm reports.

A safety record of 1,000,000 manhours without a lost time accident was recently achieved by Canadian Industries (1954) Ltd's Ontario fertilizer plant. Frank Page (second from left) secretary of the Essex-Kent div., Ontario Accident Prevention Assn., presents OAPA's million hour plaque to veteran employee John Wellington. Looking on are Gordon Jamieson, head of CIL's Accident Prevention section, and Murray Smith, works mgr.



Irrigation Research Program for O-M

A program of research on the agronomic and technical aspects of irrigation is being initiated by Olin Mathieson Chemical corp.

Supervised by the company's Irrigation dept., it will be directed by Dr. G. G. Williams, Purdue University agronomist, who joined the company Aug. 1 as manager of irrigation research and planning.

Three objectives of new program are:

1. To determine the effect of irrigation in combination with high analysis water soluble fertilizers to promote maximum yields on various soil types.
2. To determine which crops and soils can be most economically irrigated.
3. To develop improved irrigation equipment and methods.

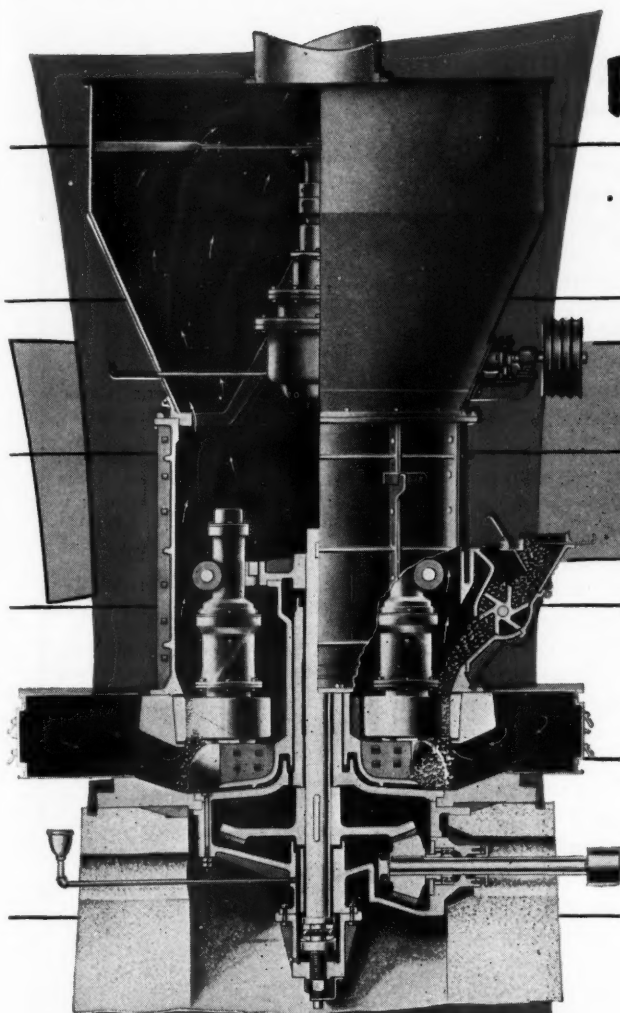
Lion Workers Reject OCAWIU as Agents

Operating and maintenance employees at Lion Oil co.'s Barton plant have rejected the Oil, Chemical and Atomic Workers International Union, CIO, as bargaining agent for the group. Fifty cast ballots in favor of and 210 voted against the union.

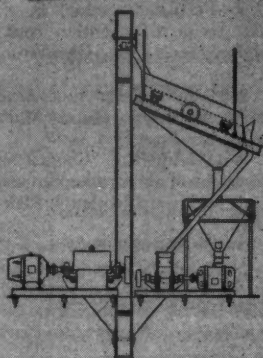
Cyanamid Combines Two Departments

American Cyanamid co.'s Market Research and New Product Development depts. have been consolidated, with the combined organization reporting to B. R. Putnam, Jr., manager of market development.

Newly named manager of the Market Research dept. is Dr. Samuel D. Koonce, and Dr. James G. Affleck will head the Product Development dept.



Cross section of Roller Mill showing how material is ground by rolls rotating against bull ring, then air swept to separator which extracts fines and returns coarse material to mill for regrinding.



WILLIAMS COMPLETE PLANTS

Williams builds all types of ready-to-install plants for crushing, grinding and air separation, including storage bins and electrical equipment. Consult the industry's most experienced engineers. Write!

Better Fine Grinding...

...How to improve accuracy, uniformity and output at reduced cost

WILLIAMS *Roller Mills*

Positive and continuous precision size control at exceptionally high production rates are only two of the superior features of Williams Roller Mills. Instant adjustment for grinding from 20 mesh down to 400 mesh, even to micron sizes, has established the Williams as one of the most versatile of fine grinding mills. Finished products can be maintained at finenesses of 99.9% + passing 325 mesh.

The operation of a Williams Roller Mill is simple, yet performance remains unsurpassed. Positive, self-adjusting feeding and blending of raw materials into the mill is automatic where pulverizing is done by grinding rolls spinning centrifugally against a bull ring. A continual rising current of cool air sweeps upward carrying ground material to the classifier that separates all finished fines from the coarse tailings which are all returned for further grinding.

Rugged construction promises less down time, lower power costs, minimum maintenance. Automatic take-up for wear is continuous.

Find out how easy it is to improve product quality and reduce production costs. Get all the facts about Williams Roller Mills.

Write today for literature.

TESTING AND RESEARCH LABORATORIES are at your service to help you solve every size reduction problem. Write for information.

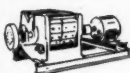
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... Business & Management

NPFI Organization Completed July 22

Effective July 22 consolidation of the American Plant Food Council and the National Fertilizer Association as the National Plant Food Institute was completed. The headquarters at 1700 K. St., N.W., Washington 6, D. C., is next to the former APFI offices. The new telephone number is DIstrict 7-0225.

Here's the line-up of NPFI staff members with brief mention of their duties:

Paul T. Truitt, executive vice-president handling government affairs, Federal and state.

Dr. Russell Coleman, executive vice-president responsible for research and educational programs.

W. R. Allstetter, vice president, heads the banker program and other activities.

Louis H. Wilson, secretary and director of information, handles general public relations.

Wm. S. Ritnour, treasurer.

Dr. Malcolm McVickar, chief, agronomic education with activities including motion picture production. Secretary of the research and technical committee.

Dr. W. H. Garman, chief, agronomic relations handling scholarships and other functions.

Delbert L. Rucker, director of publications editing the PLANT FOOD REVIEW and other publications work.

James C. Crolus, editorial assistant.

James S. Greene, assistant agronomist.

Mathieson Mergers Defended by Nichols

Thomas S. Nichols, president of Olin-Mathieson Chemical corp.,

defended mergers of his concern and its predecessor, Mathieson Chemical corp., before a recent senate judiciary committee meeting. He emphasized that the mergers were solely for diversification, that O-M has not obtained a dominant position in the chemical industry and that no combinations were evolved for tax gains.

Disagreement was expressed by Sen. Estes Kefauver who stated he felt the company was getting close to being in conflict with anti-trust legislation. He pointed out that one of the purposes of the anti-merger act of 1950 was to prohibit conglomerate mergers as well as horizontal and other types that have the effect of lessening competition.

Kefauver added that O-M has spread into many fields, even though it might not be dominant in any one.

Some controls might well be imposed on conglomerate mergers, according to Nichols, who suggested a limit of possibly 50 per cent ownership of an industry by a company. He added that O-M activities have stimulated chemical industry competition by enabling the company to effectively compete with large competitors, already well integrated and diversified on a national scale.

DOFSCO Plans NH₃, Chemical Production

Production of ammonia and other chemicals is a part of the expansion program planned by Dominion Foundries & Steel Ltd., Montreal, Que.

Four hundred tons of nitrogen are dissipated each day by the firm's new oxygen steel making plant and in the projected chemical operation this would be combined with hydrogen stripped from coke oven gases.

Calendar

Aug. 10—Ky. Fert. conf., Guignol Theatre, University of Kentucky, Lexington.

Aug. 15-19—American Society of Agronomy and Soil Science Society of America meeting, University of Calif., Davis campus. Nat'l. Joint Committee on Fert. Application meets on 15th.

Sept. 7-8—Corn Belt Anhydrous Ammonia conf., Univ. of Ill., Champaign-Urbana campus, Urbana.

Sept. 7-9—National Agric'l Chemicals Assoc. annual meeting, Spring Lake, N. J.

Sept. 7-9—9th annual Beltwide Cotton Mechanization conf., Texas A & M College, College Station, Tex.

Sept. 11-16—American Chemical Society, National meeting, Univ. of Minn., Minneapolis.

Sept. 22-23—Chemical Market Research Assn., Cavalier hotel, Virginia Beach, Va.

Sept. 28-30—New England Fert. conf., Poland Spring House, Poland Spring, Me.

Oct. 11—Western Agric'l. Chem. Assn., annual meeting, Hotel Claremont, Berkeley, Calif.

Oct. 17-18—Fertilizer section, National Safety Congress, LaSalle hotel, Chicago.

Oct. 18-20—Canadian Entomological Society of America, Fredericton, B. C.

Oct. 27—Middle West Soil Improvement Committee annual business meeting, Sherman hotel, Chicago.

Nov. 2—Annual convention, Pacific Northwest Plant Food Assn., Pilot Butte Inn., Bend, Ore.

Nov. 3-4—Northeastern div., American Phytopathological Society, Eastern Farmers Exchange, Inc., 27 Central St., W. Springfield, Mass.

Nov. 4—Fertilizer section, S. C. annual Accident-Prevention conf., Hotel Francis Marion, Charleston, S. C.

Nov. 7-8—Calif. Fert. Assn. 32nd annual convention, Hotel Mark Hopkins, San Francisco, Calif.

Nov. 8-11—American Council of Independent Laboratories annual meeting, Westward Ho hotel, Phoenix, Ariz.

Nov. 17-18—Nitrogen Solution field day, National Nitrogen Solution Assn., State Armory, Springfield, Ill.

Nov. 29-Dec. 2—Entomological Society of America, Netherlands Plaza hotel, Cincinnati.

Dec. 5-7—Agric'l. Ammonia Institute, Kansas City, Mo.

Dec. 5-7—Chemical Specialties Mfrs. Assn., annual convention, Roosevelt hotel, New York City.

Dec. 15-16—Beltwide Cotton Prod. conf., Hotel Peabody, Memphis, Tenn.

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Nitrogen News

Wisconsin NH₃ Trade Association Planned

A state trade association is planned by Wisconsin anhydrous ammonia dealers. Initial work was completed at a meeting in Madison on July 11 at which Rolad Strid, Strid Grain co., Green Bay, was named chairman of a committee which will draw up charter provisions and by-laws.

Other committee members include G. A. Davidson, Coulee Chemical co., La Crosse; Del Christiansen, Lein Oil co., Janesville; Robert Howard, Baldwin Liquid Fert. co., Baldwin; and Bruce O'Conner, O'Conner Oil co., Fond du Lac.

Dr. Arthur M. Smith, Olin Mathieson agricultural director, addressed the dealers and predicted an annual increase of 5 per cent in fertilizer nitrogen consumption for the next 10 years. With proper industry promotion, the figure could be raised to 6 per cent, he added.

Pasture development, said Smith, represents one of the greatest potentials for increased NH₃ sales, once farmers realize the value of grassland farming.

He also told the dealers that application equipment represents the greatest current need—recent innovations have been minor and insufficient.

Begin Work on Shell Ventura Urea Plant

Shell Chemical corp. has announced plans to build a urea plant at Ventura, Calif., the first west of the Rockies. Construction will start shortly, and the plant will be in operation by September, 1956.

The plant, which will have a daily capacity of over 100 tons, will secure raw materials, am-

monia and carbon dioxide, from the adjoining Shell ammonia plant at Ventura. Manufacturing process has been licensed from Montecatini, and M. W. Kellogg co. has been selected as contractor.

Oil Concerns Join Mid-South Program

Continued expansion of Mid-South Chemical corp., Memphis, Tenn., is slated through a program involving expenditure of about 10 million dollars for transportation and distribution facilities. Ellis T. Woolfolk, president, has also announced that Cities Service co. and Continental Oil co. have joined in the development.

The two oil concerns will erect an anhydrous ammonia plant at Lake Charles, La., where petroleum by-products will be utilized. Storage centers will be constructed at strategic locations along the Mississippi river from Minnesota to the Gulf and the intercoastal canal from the Lower Rio Grande valley to Florida, each supplied by barges.

It is expected that the new facilities will make the concern the largest ammonia distributor in the nation.

Woolfolk will continue to head the enlarged company and Jesse D. Wooten remains as vice president. Other officers will include A. P. Frame, vice president; H. G. Osborn, vice president; John C. Hogan, secretary-treasurer; and B. M. Scofield, comptroller.

Operating personnel include David H. Bradford, sales manager; Charles E. Woolfolk, assistant sales manager; and Harry B. Gunther, operations manager. Frank Gillentine will be responsible for distribution in the present territory covered by Mid-South.

Two V-P's Elected by Chemical Enterprises

Two new vice presidents have been elected by the board of directors of Chemical Enterprises, Inc.

Charles H. Lockton has been named vice president and treasurer. He has served as chairman of the board and president of E. R. Squibb & Sons of Turkey and as treasurer of the Squibb overseas organization.

New vice president in charge of purchasing, Maurice E. Ash, formerly headed the purchasing division of Merck & co.

Kellogg to Erect West Coast Plant

Initial activities have been started by M. W. Kellogg co. in the construction of a 300 ton per day anhydrous plant for Standard Oil co. of California's new petro-chemical facilities at Richmond. The plant has been designed to employ the M. W. Kellogg process of steam methane reforming, in which natural gas and refinery gas are used as starting materials.

A substantial portion of the plant's production will be used in the manufacture of complete fertilizers.

Nitrogen Facilities Expanded by CIL

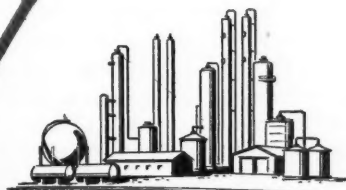
By next summer, Canadian Industries Ltd. expects its new \$9 million anhydrous ammonia plant at Millhaven, Ont. to be completed. To employ about 100 persons, the plant will cover 20 acres adjacent to the company's terylene plant, and its rated capacity will be 200 tons of ammonia per day.

Expansion of CIL Beloit, Que., facilities for production of ammonia solutions, using ammonia from the new plant, also is planned by the firm.

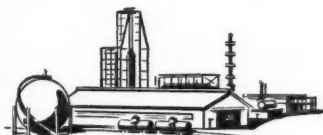
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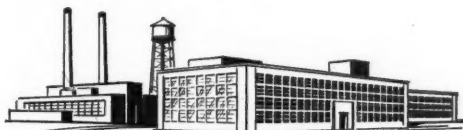
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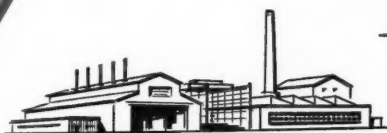
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CONSTRUCTION

Western Phosphates Plans New Additions

Although Western Phosphates, Inc.'s Garfield, Utah, plant is currently operating 120 per cent of rated capacity, the firm has developed plans for expansion of the ammoniated phosphate and treble superphosphate plant.

According to Hans Stauffer, president, the expanded facilities are required to meet the heavily increased demand for phosphate fertilizers in the western area.

Calspray to Expand Research Facilities

A contract has been awarded to C. Overaa and co. by California Spray-Chemical corp. for construction of expanded laboratory facilities and additional office space to be used by the Research and Development dept. of the company.

New pesticides developed in these labs will be tested for effectiveness on experimental animals,

insects and plants at the recently announced bio-screening laboratory, being built by Cal-spray on Standard Oil co.'s tank farm hill outside Richmond.

This expansion marks the beginning of a multi-million dollar expansion program, scheduled for completion late in 1956, which will also include a 16 million dollar fertilizer plant and additional new quarters for administrative and office personnel.

CCI Builds Alabama Contact Acid Plant

A \$2 million contact sulfuric acid plant being built by Consolidated Chemical Industries Inc. at Le Moyne, Ala., is scheduled for completion by mid-1956.

Located adjacent to Courtauld's (Alabama) Ltd. viscose rayon works, the plant will incorporate the latest advances in engineering design, reports CCI. Sulfur will be supplied by water transportation to company docks on the Mobile river.

Sohio Lima NH₃ Plant Near Completion Date

Construction is progressing on schedule at the Lima, O., site of new facilities for Standard Oil co.'s (Ohio) Petrochemical dept., as shown in the aerial photo.

The first unit, a 300-ton per day anhydrous ammonia plant, will be completed late in September. All major pieces of equipment are set, and pipe work is filling in rapidly. The next unit, scheduled for completion Nov. 1, is a nitric acid unit with a daily capacity of 180 tons. Field construction is under way, with much of the equipment on the construction site.

The urea unit, last to be in the field, is scheduled to be in operation in January, 1956. Blending, storage and shipping facilities will be completed along with the producing unit.

The utility section of the plant was placed in operation late last month. Labs and shops will be completed Sept. 1, with office facilities scheduled to be ready Nov. 1.

Construction progresses on schedule at Sohio's Lima, Ohio nitrogen facilities as shown in this aerial view.



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PEOPLE

American Chemical Paint co. William Allen has been named chemical director of the Agricultural Chemical div.; J. M. F. Leaper, senior scientist in the div.

American Cyanamid co. Dr. Norman A. Shepard, who joined the firm in 1936, has retired as chemical director.

American Potash & Chemical corp. David Burnett Scott, western sales manager until his retirement, died of a heart attack on June 20 at his home in Altadena, Calif.

James H. Jensen has joined AP & C as an advisory engineer at its main plant at Trona, Calif.



Miller

Armour Fertilizer Works. Newly named executive vice president is H. Vise Miller. After going to Armour in 1923, he worked as a

salesman, assistant manager of the Nashville div., manager of the Texas div. and as area sales manager at Atlanta.

Concurrently, Miller was named assistant vice president of the parent Armour & co.

Brea Chemicals, Inc. Dr. Rex E. Lidov has been appointed research associate in the Research dept. Formerly assistant manager of Shell Development co.'s Agricultural Chemicals div. in



Lidov

Denver, Dr. Lidov will be responsible for some aspects of new product development.

The inventor of aldrin and isodrin, he directed much of the original development of chlordane, dieldrin and endrin.

California Spray-Chemical corp. Former supervisor of fertilizer sales, Leslie R. Hamilton, is appointed coordinator of fertilizer operations, to coordinate marketing activities in connection with production by the \$16 million fertilizer plant being built in Richmond.

Calumet & Hecla, Inc. Walter A. Barz has been appointed purchasing manager of the Calumet div., succeeding L. H. Donald who retired in June after 40 years of service.

Campbell Chemicals, Inc. Earl W. Kersten is named vice president in charge of sales. Prior to his appointment he was division manager of Dodge & Olcott Inc., Atlanta, Ga.

Columbia-Southern Chemical corp. Appointment of Henry W. Rahn as assistant technical director has been announced. Associated with the firm since 1933, Rahn has been a chemical engineer at the Barberton, O., plant and director of research and development at Corpus Christi, Tex.

Consolidated Chemical Industries. Hubert C. Snowden is new general superintendent of the Southern div., replacing J. C. Crowder, who moves to San Francisco as vice president and general manager in charge of West and East coast glue operations; O. D. Massey replaces Snowden as Houston plant manager; and J. A. D. Todd succeeds Massey as Fort Worth plant manager.

Diamond Alkali co. Robert R. Wood, of the New York sales

staff, has been promoted to special staff assistant in the Cleveland Sales dept.; Robert Powell succeeds him in New York; Charles H. Gillespie replaces Powell as sales representative in the Louisville area; Charles B. Kayser represents the company at Columbus; Louis P. Lambros succeeds him on the Cincinnati sales staff.

Diamond Black Leaf co. William B. Francis has been named sales representative for the Black Leaf house-and-garden line of pest control products, with headquarters in Dallas.

DuPont co. Thomas J. Desmond succeeds W. James Latimore as Chicago district sales manager of the Grasselli Chemicals dept. Latimore moves to Wilmington on special assignment.

Federal Chemical co. Wayne A. LeCureux has joined the com-



LeCureux



Shepherd

pany as assistant sales manager of the Columbus, O., div., and Charles W. Shepherd has been named plant manager, according to a report from J. D. Stewart, Jr. LeCureux has had 10 years experience in the fertilizer industry and is a graduate of Michigan State University. A graduate engineer from Vanderbilt University, Shepherd has been with Federal for several years. Alvin R. Wagner has been appointed assistant plant manager.

Heckathorn & co., United Chemical co. (Turn to page 20)

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5 PHILLIPS

**Fertilizer
Materials for
High
Analysis
Mixtures**

1 Ammonium Sulfate



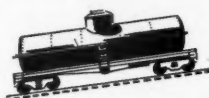
New Premium Quality Phillips 66 Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry-cured* to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

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Phillips 66 Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Adams Terminal near Houston, Texas.

3 Nitrogen Solutions



Get more N per dollar! There are three Phillips 66 Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep handling costs low; help rapid, thorough curing.

4 Ammonium Nitrate



Phillips 66 Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills or pellets resist caking, handle easily. Depend on Phillips 66 Prilled Ammonium Nitrate for uniform free-flowing properties in formulations and top-notch crop response as a direct application material.

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TULSA, OKLA.—1708 Utica Square
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... People

(from page 18) and **United Fertilizer co.** Reorganizational

changes: Ivor R. Burden designated vice president and general manager of the three companies and United Chemical sales manager; Harry R. Field, sales manager for Heckathorn; Peter Cherian, sales manager of United Fertilizer and purchasing agent for the three firms; E. G. Trimpey, operations manager and assistant secretary of all three companies.



Burden

International Minerals & Chemical corp.

New Plant Food div. marketing staff manager is Gerard J. Carney, former vice president and general sales manager of Dayton Pump and Manufacturing co. With headquarters in Chicago, he will report directly to M. H. Lockwood, vice president in charge of the division.



Carney

National Agricultural Chemicals Assn. Donald L. Miller is new editor of the NAC News Service, replacing Scott Runkle who recently became director of public relations for the Commonwealth of Puerto Rico.

Miller was graduated from Kenyon College magna cum laude in 1940 and since has served on newspapers in Pittsburgh and Washington D. C.

Olin Mathieson Chemical corp. Former deputy secretary of defense and president of the Manufacturing Chemists' Assn.,

William C. Foster, became an executive vice president of Olin Mathieson on Aug. 1, with headquarters in New York.

Sinclair Chemicals, Inc.

Joseph H. Rockett, 47, assistant manager, died suddenly on June 29 at his home in New York City.

Spencer Chemical co. Two promotions have been made in



Bingham



Dinges

top sales management and the sales division has been divided into seven departments.

H. R. Dinges, assistant general sales manager, has been named general sales manager, and H. E. Bingham, who was acting director of product sales, has been designated general manager of sales services. Bingham will head activities of four departments—Sales Development, Agricultural Chemicals; Sales Development, Industrial Chemicals; Traffic and Advertising.

Also announced was appointment of W. D. Van Aken, former Kansas-Oklahoma sales representative, as Mid-West district sales manager.

Stauffer Chemical co. New manager of the Package and Container section, Traffic dept., is Cornelius Haas.

United States Potash co. Dr. George Selbie Gordon joins the firm as director of research. Since March, 1951, Dr. Gordon has

been vice president of Titanium Zirconium co., in charge of all technology and development.



Gordon

W. B. Porterfield, U. S. Potash assistant sales manager, has resigned to become vice president and sales manager of National Potash co.

Virginia-Carolina Chemical corp.

A. P. Gates has been named assistant to C. Cecil Arledge, vice president, succeeding E. Y. Bass who retired June 30 after 45 years with V-C. Gates joined the firm in 1950 and in 1952 was made an assistant sales manager, General Sales dept.

R. Andrew Jenkins has been named manager of the Baltimore sales office, replacing H. A. Varnay, who retired June 30 after 46 years as a V-C employee.

Other sales personnel changes: Transfer of Robert G. Kreiling,



Gates



Jenkins

Jr., from Savannah sales office to General Sales dept., Richmond; promotion of J. S. Crosby, G. F. Flenniken and A. T. Montgomery to assistant managers at the Baltimore, East St. Louis, Ill. and Birmingham sales offices, respectively.

Western Phosphates, Inc. Appointment of Elwood I. Lentz as general manager is announced by Hans Stauffer. Lentz had been vice president and plant manager since founding of the firm in 1952.

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GOVERNMENT

TVA Reports 1954 Visitors, Licenses

More than 700 technicians, most of them representatives of American chemical and fertilizer companies, visited TVA's Muscle Shoals Development Center during the 1955 fiscal year ended June 30, reports Charles H. Young, TVA's manager of chemical engineering.

Young said that during the year 19 companies were licensed to use the agency's continuous process for ammoniating and granulating fertilizers or to manufacture the equipment. To date 42 companies have been licensed, 12 to manufacture equipment and 30 to use the process. Six more licenses to use TVA's cone mixer for producing superphosphate were issued during the year, Young reported, five to fertilizer producers and one to an equipment manufacturer. This brought the total of such licenses to 17, of which 12 are to use the process, and five to manufacture the equipment.

A survey of liquid fertilizers now on the market has been prepared by TVA, concerning the use of materials, kinds being made and types suitable for various parts of the country.

FTC Reports

Distributors of "Tele-Vapor Jr" insecticide device, **Carol Beatty co.**, have agreed not to claim that the product keeps a house free of insects or eliminates all insects.

It is an asbestos collar impregnated with lindane. When the collar is fitted over a light bulb of sufficient wattage the lindane is vaporized.

Because the vaporizer "Insect-O-Lite" used with Insectane is

not sure death to insects, **Insect-O-Lite co.**, Cincinnati, has agreed not to advertise that it is.

The company still may represent that its product is effective in killing ants, clothes moths, roaches, silverfish, spiders, water bugs and carpet beetles when they are out in the open and accessible.

USDA Merges Bollworm Sections

Last month USDA merged into a single continuous regulated area the sections in six Southwestern states regulated because of the pink bollworm, previously divided into heavily and lightly infested areas. The move was necessary, said USDA spokesmen, because heavy infestations have been found sporadically throughout the entire area.

At the same time 20 Arkansas counties were added to the regulated district and quarantine regulations were changed to redefine oil mill waste, provide added means of moving edible okra from the infested area and to modify precautions applying to movement of cotton harvesting and ginning machinery.

The entire states of Arizona, Arkansas, Louisiana, New Mexico, Oklahoma and Texas are included in the quarantined area but the regulated district includes only Oklahoma and Texas and the portions of the others that are actually infested or threatened by the pest.

New CSC Sales Head

Frank C. Daniels has been named general sales manager of the Commodity Stabilization Service, vice president of Commodity Credit corp. and special advisor to the CCC board of directors.

FOA Authorizations

Cambodia. \$22,300—agricultural pesticides (PIO/C No. 86-11-004-5-50098). Source—USA and poss. Ending delivery date—Nov. 30. Procurement through Emer. Proc. Serv., GSA.

Greece. \$2,270,000 and \$339,000—nitrogenous fertilizers (PA No. 4-230-99-01-4005 and 40-230-99-74-5007, respectively). Contract period—June 1 to Aug. 31. Source—World wide. Ending delivery date—Oct. 31.

India. \$50,000—commodities for project for determination of soil fertility and fertilizer use (PIO/C No. 86-11-004-5-50098). Source—World wide. Ending delivery date—Jan. 31, 1956.

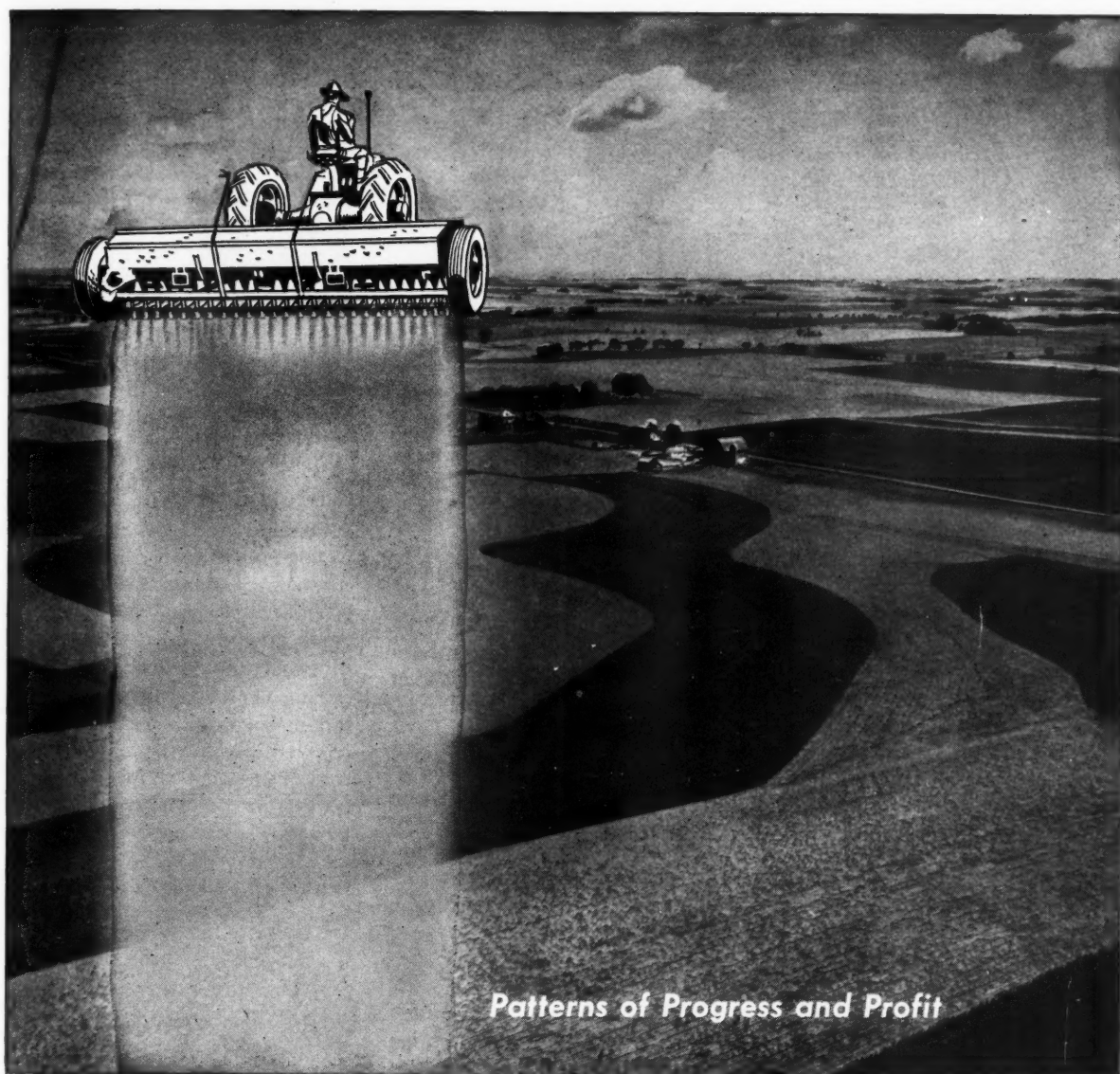
Liberia. \$2,124—fertilizer materials (PIO/C No. 69-11-001-8-50834). Ending delivery date—Sept. 30. Source—USA and poss. Procurement through EPS, GSA.

Pakistan. \$2,000,000—nitrogenous fertilizers (PIO/C No. 91-13-021-6-50365). Contract period—June 17–July 31. Source—World wide. Ending delivery date—Sept. 30. Procurement through Ministry of Industries, Dept. of Supply and Development.

\$1,046,452—equipment for fertilizer factory (PIO/C No. 91-23-007-6-50277). Contract period—June 29, 1955, to March 31, 1956. Ending delivery date—Aug. 31, 1957. Source—World wide. Procurement through Pakistan Industrial Development corp.

\$60,875—agricultural pesticides (PIO/C No. 91-13-022-9-41723). Contract period—June 29 to Sept. 30. Source—World wide. Ending delivery date—Dec. 31.

\$7,600—agricultural pesticides (PIO/C No. 91-13-022-9-41724). Contract period—June 29 to Sept. 30. Source—World wide. Ending delivery date—Dec. 31. Procurement through Ministry of Industries, Dept. of Supply and Development.



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AUGUST, 1955

23

Associations & Meetings

Ralph Griffin Honored At Ga. PFES Dinner

Ralph Griffin of Douglas, Ga., has been named a life-time honorary member of the Georgia Plant Food Educational Society. At the Georgia Grazing System Contest Banquet, a testimonial was read outlining the outstanding contributions Griffin has made to his community.

In its publication, "What and Why," the group reports that this year members can visit and see for themselves how profitable grazing systems can be established and maintained with the proper use of fertilizer and know-how at the four fertilizer dealers-manufacturers conferences scheduled for this summer.

GPFS's secretary-treasurer states that the society now has 292 paid members.

CFA Scholarships, Fert. Handbook Sales

California Fertilizer Association's Soil Improvement committee has awarded two 1955-56 scholarships to Terry Dewitt Cook and George M. Kihara, of Calif. State Polytechnic College, San Luis Obispo campus.

The group reports that the second edition of the Western Fertilizer Handbook is selling at a rapid rate, and Earle J. Shaw, chairman of the Handbook subcommittees, suggests that inter-

ested persons place orders now. The book is available at \$1 per copy from CFA, 475 Huntington Drive, San Marino 9, Calif.

NPFI Awards at Ag College Editors Meet

Two National Plant Food Institute awards were presented at the recent convention of American Association of Agricultural College Editors in Omaha, Neb.

An extension information specialist at Washington State College, Mrs. Anna Jim Erickson, received the first AACE-NPFI award at a special luncheon ceremony and was presented a \$500 check and a scroll by Louis H. Wilson, NPFI.

The latter award is intended to provide an opportunity for a member of the association to receive advanced professional improvement training in agricultural information work. Mrs. Erickson was selected for her achievement in interpreting and reporting agricultural and home economics developments affecting Washington farm families and for initiating and carrying out an effective informational training program for county extension agents and 4-H Club leaders.

James Rudolph Williams, a senior at Alabama Polytechnic Institute, won the 1955 Agronomy Achievement Award for students at the school and received \$200 from Dr. Willard Garman, chief, agronomic relations, NPFI. In addition, his name has been engraved on the Institute's Agronomy Achievement Award Plaque.

James R. Williams receiving \$200 cash award from Dr. Willard H. Garman, chief of agronomic relations for NPFI, sponsors of the award.

L. H. Wilson Awarded Reuben Brigham Prize

A top honor for agricultural public relations experts, the Reuben Brigham award, has been presented to Louis H. Wilson, secretary and director of information for the National Plant Food Institute, by the American Association of Agriculture



Wilson

College Editors.

Presented at the concluding banquet session of the association convention in Omaha, Neb., it is given each year to a non-member of the group for meritorious service to agriculture.

This was the first year that the bronze plaque was awarded to a representative of the agricultural trade. Previous recipients were persons in the mass communication media. The presentation was made by Earl Richardson, extension editor, Michigan State College.

WACA Meeting Set For Berkeley, Calif.

C. O. Barnard, executive secretary, reports that the annual meeting of Western Agricultural Chemicals Assn. is set for October 11, in the Hotel Claremont, Berkeley, Calif.

S. C. Fert. Meet

Some 300 persons including fertilizer manufacturers, dealers and salesmen were on hand for the annual South Carolina fertilizer convention held on June 2 at the Sandhill Branch Experiment Station.

B. D. Cloaninger, head of the Clemson Fertilizer Inspection and Analysis dept., arranged the program.



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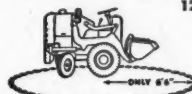
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The Jaeger Auto-Scoop can make fast work of your bulk handling as it is doing here at Mansfield Brass & Aluminum Co., Mansfield, Ohio, where it unloads box cars, stockpiles, delivers molding sand to preparators, moves core sand, etc. That's because it's specially designed to work easily in narrow aisles, box cars and other tight places, turn short, carry faster and lower, dump higher and farther. Many other time-saving features. Write for Catalog L12-4.

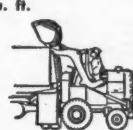
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5" shorter turning radius (6'4"). Faster speeds to 13.88 mph in reverse, 7.66 forward.

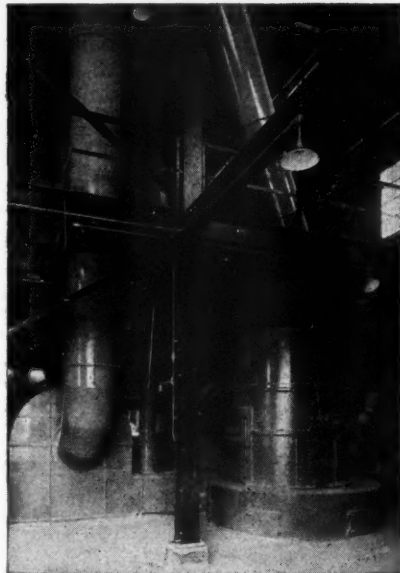


Higher clearance (6'8"), more reach (2'7").

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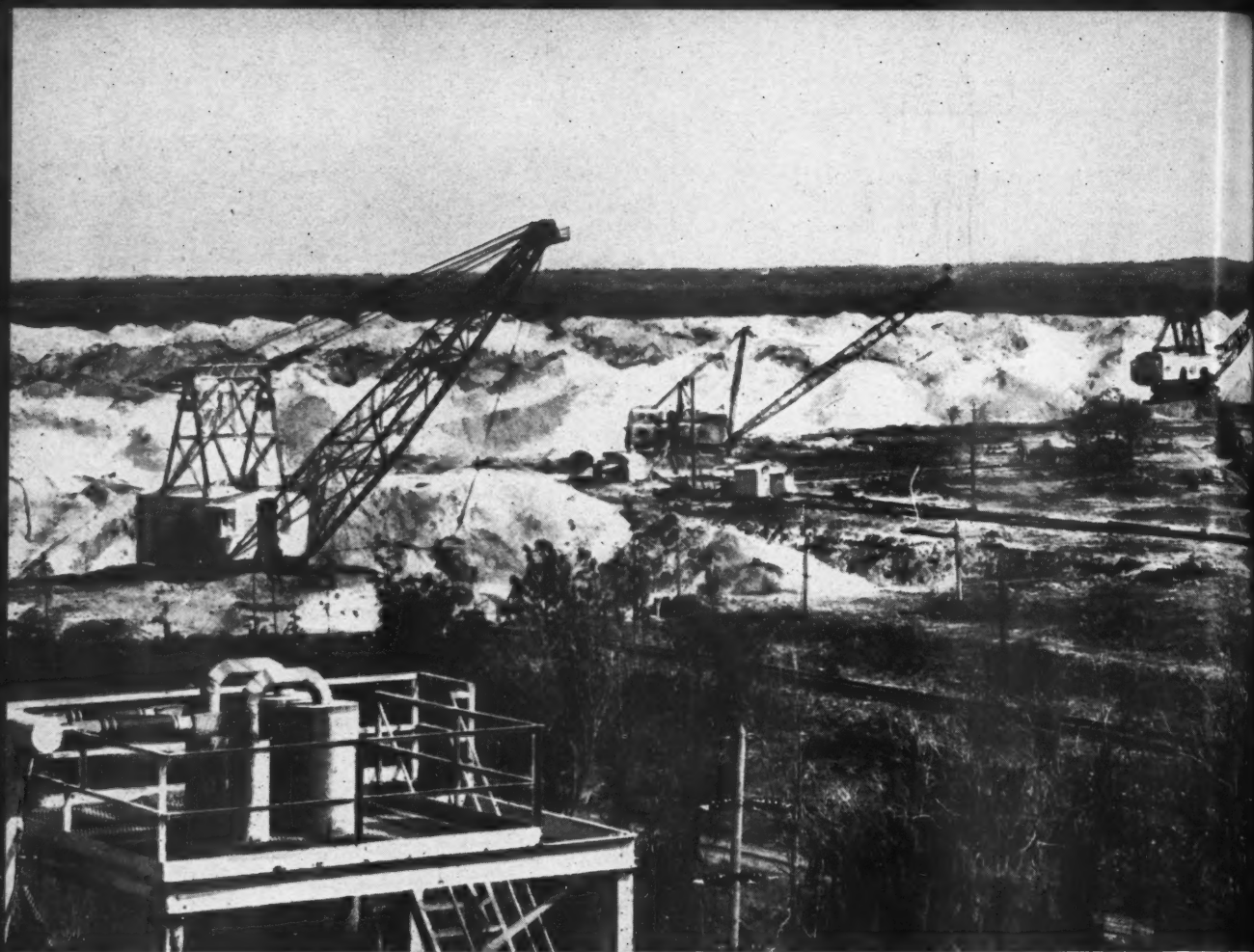
Designed and constructed for FINE grinding of limestone, phosphate rocks, and many other similar materials . . . Bradley Pneumatic Hercules Mill produces a uniform grind from 20 to 325 mesh. Floor level installation provides easy accessibility . . . lowest installation and maintenance cost. Durable, non-clogging vibratory feeder for dependable, worry-free operation. Material with excessive moisture can be dried within the mill system.

For complete information, write for Catalog No. 62



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Three of the A.A.C. Co's electrically-operated draglines at work at our phosphate mines in Central Florida. Bucket capacities range from $9\frac{1}{2}$ to 17 cubic yards. The 17-yard draglines with their 175-foot booms each weigh more than a million and a half pounds and can move 35,000 tons of material in 24 hours. From these rock deposits flow a continuous stream of high quality phosphate rock, assuring a dependable source of supply of AA QUALITY phosphorus products, see list below.



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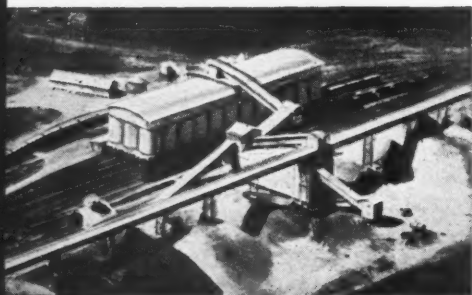
All grades of Complete Fertilizers Superphosphate

Gelatin Bone Products Salt Cake Ammonium Carbonate

Sulphuric Acid Fluosilicates Insecticides and Fungicides

Phosphoric Acid and Phosphates

Phosphorus and Compounds of Phosphorus



From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

Washington Report

By John Harms

- New records seen in crop production
- Diverted acre controls possible for '56 season
- USDA special credit program for the Dust Bowl

Crop yields very probably will be the big news in farm production this year—aside from new surpluses created—when the harvests finally are completed. Increased fertilizer use is indicated.

Production prospects at this early date read like a new record book for most commodities. Growing conditions at press time were almost unbelievably good in many areas of the country, although some spots weren't doing quite as well. Even though weather and insects may turn out for the worse later on, there's little doubt production this year will be the second biggest in history. Total output in 1948 was higher.

Corn yields in this production season look like the most ever, about 42 bushels per acre. That's five bushels more than last year and six more than average. In the Main Belt, yields are forecast at 48 bushels per acre, compared with 43 last year and the 42-bushel average. Aside from ideal growing conditions, the Agriculture department attributes the big boost to **an increase in the use of nitrate fertilizer.**

Other crops which are officially forecast at new high yields, or which may turn out so later, include: Rice, oats, dry beans, sweet potatoes, potatoes and sugar beets. Potatoes, particularly, are going for a record in a big way. Yields are predicted at 277 bushels per acre this year, which means a whopping 24-bushel jump from the previous record set back in 1950.

A big question mark falls across cotton, as usual. While acreage is 17.1 million—lowest since 1908—some cotton experts look for production to almost fill one year's domestic and export needs. They base this on speculation that cotton yield this year may top last year's record 341 pounds per acre. Cut back sharply in the past two years, growers are keeping only the best land and fertilizing liberally.

Including high yields and bigger acreages in non-controlled crops, new record production this year is indicated for such crops as barley, soybeans, grain sorghums and hay . . . near records for corn, oats and dry beans. While potato production may not be a record, the supply will amount to a critical surplus.

Programs to control the use of diverted acres, as a means of holding down surplus production, are getting renewed attention in Washington. The Agriculture department last summer announced intentions to slap a tough control program on acres forced out of such things as cotton and wheat in 1955, but later withdrew it entirely. USDA officials who pumped for the program are needling those who favored repeal with "I told you so," with some justification.

It is pointed out by the USDA Crop Report that more than 8 million acres taken out of cotton and wheat this year mostly went into feed grains, particularly oats, barley, grain sorghums and soybeans. These are the crops which will produce the new surplus headaches in the coming year—joining the burdensome surpluses of wheat, cotton and corn. But that's not all. The biggest feed grain supply in history now in prospect means farmers will produce more hogs, poultry and perhaps cattle. With hog numbers already at record levels, the government is confronted with fending off disaster prices in livestock—probably through a purchase program.

Some sort of diverted acre control program now is expected to be proclaimed—and kept in force—by the USDA for the 1956 production season. Fear is that unless this is done, another bumper production next year would be nothing less than disastrous.

Officials are seriously considering cross-compliance again. Under this program—which is the one started with last year, then dropped—farmers would be told what they could grow on land taken out of controlled crops. If they didn't comply, they'd be penalized through loss of support and conservation (ACP) payments.

Which horn of a dilemma do you take? That's the first question the Administration must answer. If a tough diverted acre control program is imposed in 1956, farmers might be further angered and vote against the party in power in the forthcoming presidential election. If such a program is not imposed, odds would favor another big increase in surpluses which could be expected to force farm prices lower. This also may cause farmer resentment at the polls.

Washington generally has underestimated the Administration's intentions about making the Dust Bowl green. It looked to many observers that the Government once again was about to postpone taking leadership in helping Great Plains farmers tie down the soil permanently. Heads are still spinning over the swiftness of Government action to date—and more to come.

The Agriculture department in early summer stepped up its soil classification survey in the Dust Bowl region to find out for what the soils there are best suited. Ordinarily this would take a dozen years to complete, but now USDA's Soil Conservation Service is aiming to do it in three or four. Then, USDA followed up quickly with an announcement of a special credit policy for the Great Plains—to be available to growers whenever their land has been classified and they are ready to go ahead on recommended practices.

The new credit program is of special interest to the farm chemicals industry. Under the program, Farmers Home Administration loans will be made for reseeding, establishment of grasslands and other approved conservation and land use practices, including soil and water erosion control measures. Also, loans for development and improvement of domestic and irrigation water supplies, repair and improvement of farm buildings, and purchase of additional land.

Loans also will be made to buy fertilizer, insecticides, farm equipment, repairs, seed, feed, farm supplies and payment of interest and taxes.

ACP payments also are expected to be geared to the special need of the Dust Bowl program. While this has not yet been announced, it is understood that a special ACP program is being worked up. . . . Under the proposal, ACP money would be available to farmers to cover "out-of-pocket" costs which are not taken care of by the loan program. These payments, of course, would not have to be paid back by the grower.

The fourth and final step in the new Dust Bowl program needs congressional approval. The USDA has not yet offered it to Congress, but insiders say it would make price support for commodities subject to whether a farmer follows the recommendations of the land classification survey.

Flue-cured tobacco growers voted for continuation of stringent marketing quotas on their next crop—in exchange for high, 90 per cent price supports. The favorable July vote means growers will take a stiff cut-back in production from this year. The quota calls for production of only 1,130 million pounds for the 1956-57 year. This compares with 1,270 million for the past year.

Peach mosaic disease is carried by a mite so small it can't be seen without a microscope, say the discoverers at the California Experiment Station. Discovery ends a 17-year search to find out how mosaic spreads. The researchers now hope to develop methods of controlling the mite . . . indicating the answer may lie in chemical sprays or dusts.

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AUGUST, 1955



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... that go into candy bars, crackers, peanut butter, and are used as fodder and as a source of medicinal oils. With over a billion pounds produced last year, the peanut is big business. The use of modern commercial fertilizers has helped make this big business even bigger.

Potash, a major component of these fertilizers, enriches the soil, improves crop quality, builds resistance to disease and increases total product yield. USP's high-grade muriate of potash has the highest K_2O content and is free-flowing and non-caking—important advantages in the production of fertilizers that help make the peanut crop a valuable addition to the American economy.



HIGRADE MURIATE OF POTASH 62/63% K_2O
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THE FARMER

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Ruralist
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**Impressive, Big-Space Advertisements
are Appearing Month-After-Month
in all These Publications**

Lion's Chemical Sales Division is working to make sure you, as a fertilizer mixer, sell more fertilizers. One way we help is by consistent advertising to dealers and farmers. This advertising emphasizes how plant foods can best serve the farmer by increasing his profits.

We also offer One-Stop Service—which means you can contract for your nitrogen requirements from a single dependable source, saving you time (which, these days, is money!). As for *quality*, you can build your own reputation on a solid basis when you depend on Lion quality.

And when you need assistance with a formulation problem, our skilled Lion technical staff is ready to help you.

Our great storage facilities and the variety and flexibility of our manufacturing operations assure you of prompt shipment.

LION—A LEADER IN PETRO-CHEMICALS OFFERS:

Lion Anhydrous Ammonia—For formulation. A uniformly high-quality basic product. Nitrogen content, 82.2%.

Lion Aqua Ammonia—For formulation or acid oxidation. Ammonia content about 30%. Other grades to suit you.

Lion Ammonium Nitrate Fertilizer—For formulation or direct application. Improved spherical pellets. Guaranteed 33.5% nitrogen. Flows freely, spreads evenly.

Lion Nitrogen Fertilizer Solutions—For formulation. Three types to suit varying weather and manufacturing conditions.

Lion Sulphate of Ammonia—For formulation or direct application. Uniform, free-flowing crystals. Guaranteed to contain a minimum of 21% nitrogen.

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LION OIL
CHEMICAL SALES DIVISION



COMPANY
EL DORADO, ARKANSAS

Accurate control featured in facilities designed by
Ark-Mo and Spencer Chemical to use available
basic data for most economical formulas

A Tour of Ark-Mo's New Plant

IMPROVED quality and reduced production costs were the principal aims of the Ark-Mo Plant Food company and Spencer Chemical company in their cooperative development of Ark-Mo's new granulated fertilizers plant now operating at Walnut Ridge, Ark. Completed during June, the facilities were viewed in action by fertilizer manufacturers from 24 states and Canada during a three-day open house.

The two concerns carefully point out that they were not pioneers in the granulation trend, but that the factory does represent a unit designed to use basic information already developed in producing the most economical formulas.

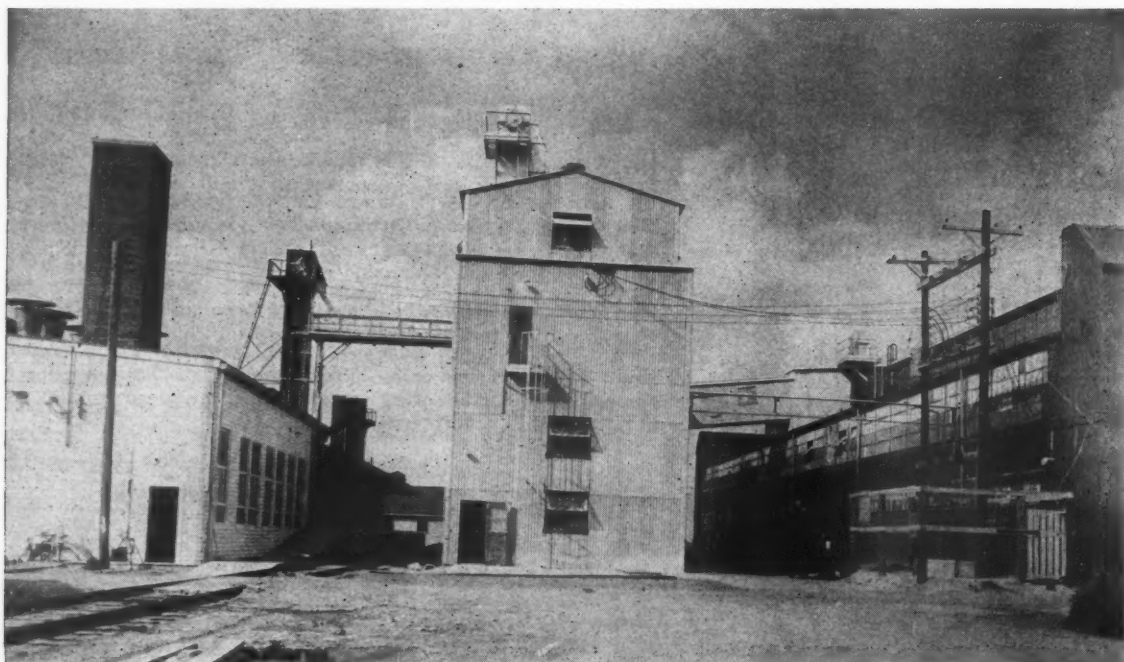
A 14-14-14 product has already been produced in experimental runs in which all nitrogen was derived from 37 per cent nitrogen solution. Later, data will be developed on grades such as a high 1-4-4 ratio.

Heart of the entire operation, says Spencer, is accurate control. Flow of ingredients and temperatures at various locations in the system are recorded on an intricate panelboard. Quantities of raw materials are accurately gauged by gravimetric feeders and flow meters.

Here is a description of the facilities and process presented through the cooperation of Spencer's Joe Sharp, who with his co-

(to page 35)

At left is raw materials storage. The Ark-Mo granulation plant is at center, with finished product storage on the right.



Chemicals

284—Uran & Feran

With the fall application season at hand, nitrogen distributors might well check into non-pressure Uran and Feran solutions from Nitrogen division. Spray or dribble type application rigs can be used to top-dress winter grains and to perk up pastures. For full information distributors can

CIRCLE 284 ON SERVICE CARD

285—Triple Super

Triple superphosphate from International Min. & Chem. has a big advantage in ammoniation, according to the producer. Manufacturing costs are cut by improved fineness, uniform, dust free particles and correct chemical structure. Processed from high quality rock the material is specially conditioned before shipment to help prevent setting up enroute to your plant. For samples and quotations, fertilizer producers can

CIRCLE 285 ON SERVICE CARD

286—Smirow Tankage

For a top source of organic nitrogen, Smith-Rowland suggests that you try Smirow tankage, a 100 per cent natural organic material consistently high in water insolubility and availability, testing about 90 per cent. To secure samples and prices, fertilizer manufacturers can

CIRCLE 286 ON SERVICE CARD

287—Aero Cyanamid

American Cyanamid suggests Aero Cyanamid as a profitable addition to your product line. Its multiple uses as a fertilizer, weed killer (pre- and post-emergence) and plow-under agent for use with crop wastes are particularly attractive to your customers. For full information and helpful sales literature

CIRCLE 287 ON SERVICE CARD

288—Fertilizer Borate

Specially developed for the fertilizer trade, Fertilizer Borate-High Grade from Pacific Coast Borax offers borax at the lowest cost per unit. The fine mesh size is ideal for blending with other plant foods and a coarse mesh grade is available for direct application. Only 82.9 lbs. of Fertilizer Borate-High Grade is required for each 100 lbs. of borax you guarantee. For more information

CIRCLE 288 ON SERVICE CARD

FREE INFORMATION to help you
solve fertilizer, pesticide problems

Reader Service

289—Fur-Ag

Complete information is available on Fur-Ag, the sterilized organic fertilizer conditioner available from Quaker Oats. Produced in volume and shipped on schedule throughout the year, it reduces bag set, promotes drillability, speeds curing in the pile and provides bulk. For more data

CIRCLE 289 ON SERVICE CARD

How to use the READER SERVICE CARD

- Circle number of literature you want.
- Print or type your name, position, company and address.
- Clip and mail the Service Card.

290—Fert. Solutions

Monsanto Chemical offers its booklet on concentrated water soluble fertilizers to readers already engaged in production of liquid fertilizers and to companies considering entry into this field. It contains full information on the subject and on Monsanto soluble ingredients. For a copy

CIRCLE 290 ON SERVICE CARD

291—Sulfate for Fall

U. S. Steel is looking for record ammonium sulfate sales this fall and, to help your sales, is running ads in 11 farm publications reminding readers of the advantages in fall fertilization. The company is prepared to fill your order but suggests that you plan now and avoid being caught short. For a copy each of the USS ammonium sulfate folder and its one and two column advertising mats

CIRCLE 291 ON SERVICE CARD

292—Penco Endothal

If you serve legume seed growers, it will pay to stock Penco Endothal Harvest Aid. The material is excellent for drying legume seed crops and seed corn in the field, eliminates windrowing and field drying, permits earlier, controlled harvesting of more acres per day, allows direct combining of crops and is clean and easy to apply. For a bulletin

CIRCLE 292 ON SERVICE CARD

293—New Attaclay Bulletin

Minerals & Chemical Corp. of America has issued a new 8 page bulletin containing full technical data on granular Attaclay. This superior material works well with toxicants and suffers minimum breakdown in processing. Several grades are available to help you meet the demand for granular pesticides.

CIRCLE 293 ON SERVICE CARD

294—Fly Repellent

Crag Fly Repellent from Carbide & Carbon Chemicals, protects cattle in the barn and pasture when included in your insecticide formulations. It repels all types of flies, synergizes pyrethrins and allethrin, is compatible with most toxicants, safe on dairy animals and livestock and improves performance of pyrethrins in the presence of moisture and sunlight. For technical information

CIRCLE 294 ON SERVICE CARD

295—Rax Powder

A third edition has been issued of the Prentiss Drug & Chem. booklet on Rax Powder, warfarin concentrate. The revised material contains manufacturing information, bait formula and proper use of the powder and a description of warfarin's action on rodents. For a copy,

CIRCLE 295 ON SERVICE CARD

Materials Handling

296—Pan Conveyors

Simplicity Engineering has issued a booklet describing its 32 series pan type conveyors, both conventional and balanced pan types. Included are illustrations and drive data charts explaining operation of the conveyors. Units can be equipped with grizzly decks, side extension, double carrying surfaces, screen cloth or perforated plate.

CIRCLE 296 ON SERVICE CARD

Process Equip.

297—Continuous Processing

Dorr-Oliver continuous processing equipment and services are described in a new 12 page bulletin which includes photos and wash drawings of the complete line. Services include pilot plant demonstration, economic analysis, flowsheet preparation, design and specification.

CIRCLE 297 ON SERVICE CARD

298—Controls

Cash Standard pressure, hydraulic, process and temperature controls are briefly described in a four page bulletin. Photos of 27 items in the CS line of valves, regulators, controllers and complete systems are pictured with a description of applications, construction, operation features and range of sizes.

CIRCLE 298 ON SERVICE CARD

Packaging

299—Auger-Matic Packers

Paper valve bags are filled, shaken and weighed in one operation by E. D. Coddington's Auger-matic valve bag packer. Features include a positive constant feed, push button control, built in scale and a security bag clamp. New small sizes of spouts and augers now permit filling of bags in the 10 to 25 pound capacity range. For more data

CIRCLE 299 ON SERVICE CARD

300—Bag Closers

A complete line of sewing heads and auxiliary equipment for closing all types and sizes of bags is built by Union Special. Capable of constant high production they stand up longer under all types of service and under severe conditions. Detailed information is contained in a bulletin.

CIRCLE 300 ON SERVICE CARD

Application and Storage

301—New Leader

The new metering attachment on Highway Equipment's New Leader fertilizer spreaders assures exact spread per acre. A drive shaft conveyor geared to ground speed delivers an accurate flow of material and twin motor-driven distributor discs provide constant width of spread regardless of truck speed. For complete information, specifications and prices

CIRCLE 301 ON SERVICE CARD

302—Dealers Wanted

Krause Flow corp. is looking for qualified dealers to handle the Liberty liquid fertilizer hose pump, a device pioneered by Liberty Mfg. co. in cooperation with USDA and the University of Tenn. The pump is a simple metering device which will handle all types of fertilizer solutions and is said to be highly accurate and free from stoppage troubles. For information, liquid plant food applicators and prospective dealers can

CIRCLE 302 ON SERVICE CARD

303—NH₃ valves

A complete line of industrial meters for NH₃, propane and oxygen is described in an 8 page bulletin from Rockwell Mfg. It also explains the Parkhill Wade dispensing system and its advantages for high vapor pressure liquids and describes typical installations for both tank trucks and bulk-loading stations. For a copy

CIRCLE 303 ON SERVICE CARD

304—Liquid Storage

If you have liquid fertilizer storage problems, rubber-lined tanks from Abrasion & Corrosion Engineering may be the answer. Available for prompt delivery, they assure complete protection from both phosphoric acid and nitrogen solutions and cost less than other types of dual purpose tanks. For full information

CIRCLE 304 ON SERVICE CARD

305—Baughman Spreader

Fertilizer spreading is simple with the ground drive Baughman unit, according to the manufacturer; neither gear shifting nor starting and stopping affect the constant volume control. A hydraulic distributor provides the same width of spread regardless of engine speed and a spread chart shows which of the 60 endgate settings to use to get the desired volume. For new literature

CIRCLE 305 ON SERVICE CARD

Miscellaneous

306—Spectrophotometer

The new IR-2A automatic infrared spectrophotometer produced by Beckman Instruments is described in a new four-page bulletin. Full specifications and exact reproductions of the transmittance type curves produced are provided. The unit is described as a high performance, low cost instrument for both research and quantitative analysis.

CIRCLE 306 ON SERVICE CARD

307—Corrosion Control

A 32 page booklet from the American Zinc Institute describes the ways in which zinc controls corrosion reducing maintenance costs and lengthening the life of steel products. Characteristics of zinc coatings, pigments and anodes are briefly discussed and illustrated. For a copy

CIRCLE 307 ON SERVICE CARD

308—Insect Display Box

Here is a device that you might use in customer education efforts. An insect display box, marketed by Mid-Western Spray Chemical, it contains twelve detailed color drawings of adult and larval stages of common cereal pests along with three pin-mounted specimens of each pest. The box measures 8" x 12" x 2". For more data and prices

CIRCLE 277 ON SERVICE CARD

309—Control Instruments

The complete line of process control instruments, standard-sized and stocked for immediate shipment by Fischer & Porter are shown in a new catalog. Complete specifications for flow rate meters, pressure regulators, chemical feeders and other units are included showing dimensions, prices, capacities and construction materials.

CIRCLE 279 ON SERVICE CARD

FARM CHEMICALS

See pages 55 & 56 for information
on these Reader Service numbers—

310—Fillmaster Unit

312—12-B Shovel

311—Steel Flooring

313—Hough Ho

314—Wonder Bldg.



The ammoniator-granulator (top) is the special feature of the plant, which was designed by Spencer. In foreground is a conventional dryer.

(from page 32) worker Jim MacArthur and Earl Day and Arville Hicks of Ark-Mo, developed the new plant design.

Handling the Raw Materials

From the superphosphate plant about 300 yards away normal super is hauled by 5-ton dump trucks

to an elevator in the raw materials building. This dumps onto a suspended pivoted screw conveyor which distributes material through the storage area with the superphosphate serving as a screw trough.

Triple superphosphate arrives in box cars and is unloaded with tractor shovels into another elevator for delivery to a belt conveyor running to a screw similar to that used for normal material.

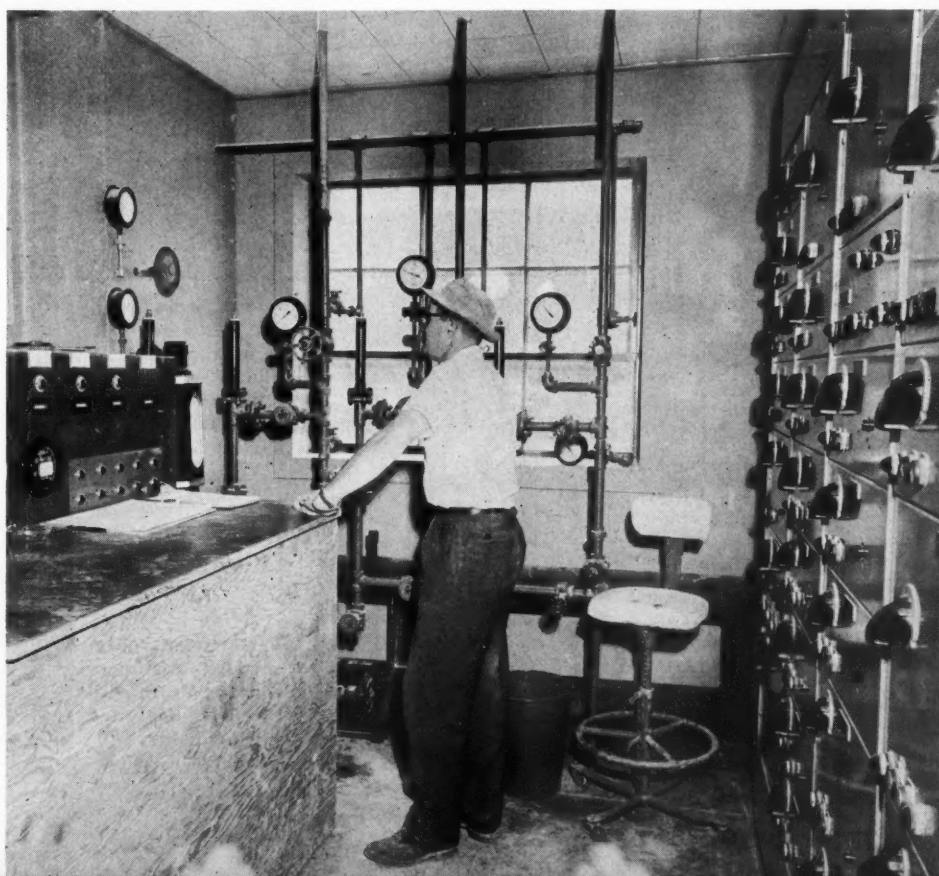
Carloads of potash are handled through the same elevator as the triple super with a flop-gate arrangement at the end of the conveyor belt directing it to the proper storage area. An underground screw unloads hopper-bottom cars, delivering materials to the same elevator.

Ammonium sulfate and inert material are received in box cars and, with a tractor shovel, dumped directly into the bins.

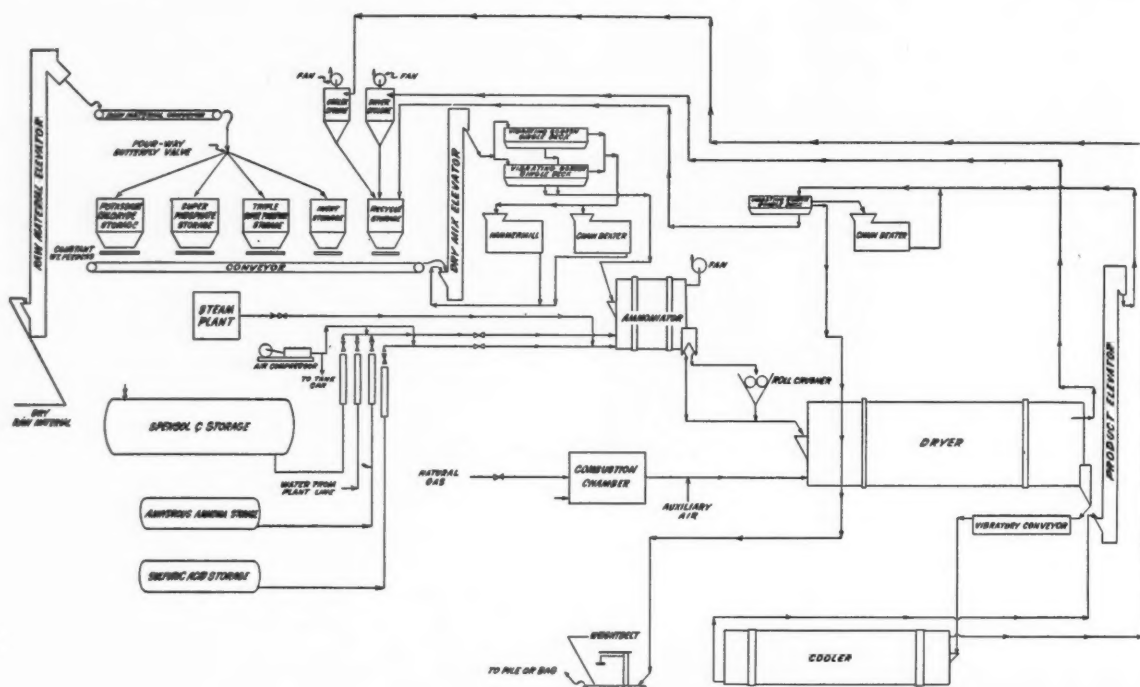
Nitrogen solution is transferred from tank cars to storage tanks located in a frame building which is kept above 50° F. in the winter with steam furnished by a 55 h.p. boiler. The transfer is accomplished with compressed air.

From tank cars or trucks, anhydrous ammonia is transferred to the storage tank by creation of a pressure differential between the carrier and the

The control room is located near the discharge end of the ammoniator-granulator, and it houses starters, flow meters, temperature recorder, gravimetric feeder recorders and bin level indicator lights.



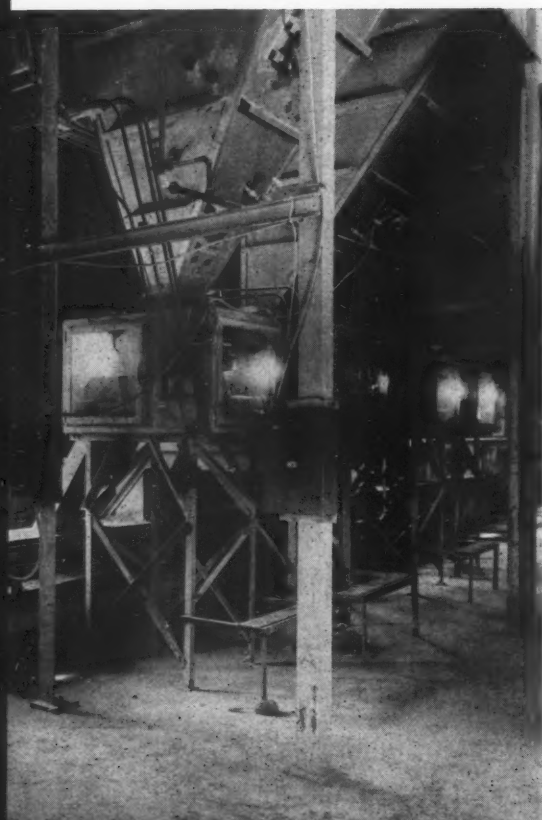
Flow Diagram of the Ark-Mo Plant



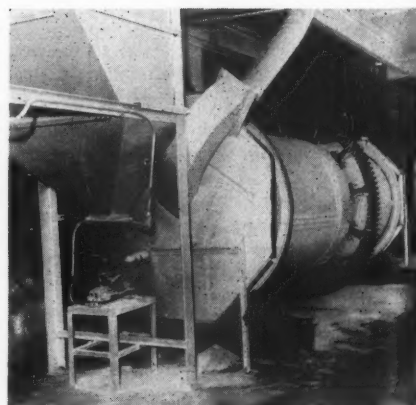
Gravimetric feeders. The 15 ton hopper is equipped with a feeder having 54,000 lb./hr. delivery rate, while the other three feeders have 28,000 lb. delivery rate.



Raw materials screens. Raw materials mixture passing the screen flows into the ammoniator-granulator.



Parting agent equipment, consisting of rotating drum with specially designed mixing flights.



storage unit. A compressor removes ammonia gas from the latter unit and compresses it into the tank being unloaded. Sulfuric acid is transferred with compressed air.

Local ordinances permit use of the city water supply with a check valve preventing back flow of contaminated water into the main.

Loading Materials into the System

Solid raw materials are delivered by tractor shovel to an elevator equipped with a clod breaker in the intake hopper. A conveyor belt then takes them to a system of chutes located over the four feed hoppers—one 15 ton unit, two 10 ton and one five ton. Bin level indicator lights and pneumatic valves controlling the flop-gates permit the shovel operator to keep hoppers properly charged.

Hoppers are equipped with pneumatic rubber bin unloaders which continually break material away from the sloping sides.

Gravimetric feeders delivering to a common conveyor belt are adjusted for a maximum delivery rate of 54,000 pounds per hour on the large hopper and 28,000 pounds on the others. Materials are carried to an elevator and lifted to chutes with flop-gate control that may be adjusted to deliver to either or both of two 10 mesh screens.

Oversize is sent to either or both a hammer mill and a chain mill for pulverization. The mixture of raw materials passing the screens flows into the ammoniator-granulator.

Nitrogen solution is pumped from storage, metered through a flow meter in the control room and is then directed into a liquid mixing pipe. (This is provided to mix the solution, anhydrous ammonia and water when all three are used in the same formula.) It flows from the pipe through the sparger into the ammoniator-granulator.

A pump is used to deliver anhydrous ammonia from storage, and this is metered and passed through a flow meter and the mixing pipe to the sparger. Water is metered and flows through both mixing pipe and sparger.

Sulfuric acid is pumped, metered and released into the ammoniator-granulator through an acid sparger. Steam, under its own pressure, goes through a flow meter and is introduced through the acid sparger since this and sulfuric acid are not used in the same formula.

The Process Equipment

A control room housing starters, flow meters, temperature recorder, gravimetric feeder recorders and bin level indicator lights is located near the discharge end of the ammoniator-granulator.

The first four feet of the 7' dia. x 8' ammoniator-

granulator is used for ammoniation, the remainder for granulation. This, says Spencer, is the only specially designed piece of equipment used in the plant—all other units are standard products. It is driven by a 15 h.p. motor with a variable speed drive used as the reducer.

Air is blown on the bed of material by a fan with 7½ h.p. drive and steam generated by the chemical reaction is removed by a suction fan driven by a 5 h.p. motor.

Over-size from this unit are separated by a scalper and passed through a roll crusher before entering the dryer. Driven by a 40 h.p. motor, the dryer measures 8' dia. x 40' and has a co-current, ten-million BTU per hour combustion chamber. The first three feet of the dryer has directional flights to move material away from the intake end, the second three feet has no flights, and at this point, lifting flights begin and continue to the discharge end. A 40 h.p. motor drives the dryer cyclone fan.

From this point material is moved to the cooler with a 2' x 8'3" vibratory conveyor. The cooler itself is 7' dia. x 30' long and is powered by a 20 h.p. motor. A 30 h.p. motor drives the cooler cyclone fan.

The cooler delivers into a finished product elevator which lifts the product to a double-deck finished product screen equipped with a 6 mesh top and a 12 to 20 mesh bottom depending on the grade.

Oversize passes through the crusher and is either broken to on-size or made into fines. Fines from the finished product screen and dust from the cyclones flow into the recycle hopper.

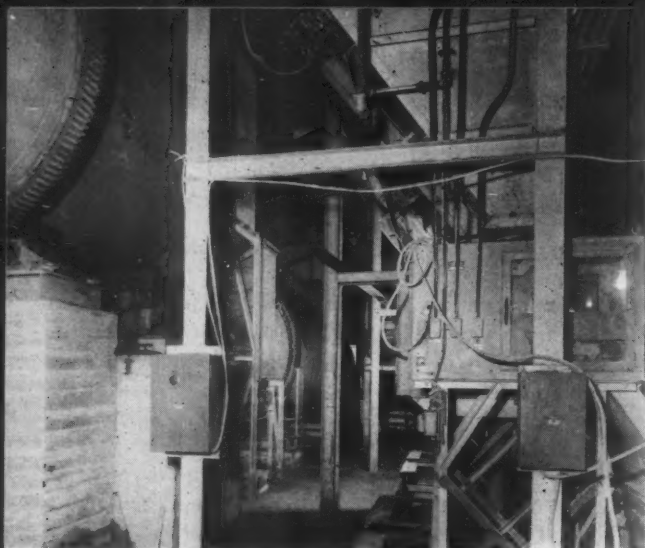
The recycle operation is of particular importance in controlling consistency of materials in the ammoniator. It provides material to help take up the large quantities of liquids initially introduced, avoiding formation of a slurry.

In discussing the recycle, Spencer comments that it is not practical to have ammoniators that will create optimum conditions for granulation using the most economical formulas for the many grades now marketed. A compromise is sought using steam to increase plasticity in formulas using a small amount of liquid and, where large quantities of liquid are required, a cooled recycle decreases plasticity.

Recycle temperature affects the amount required to lower the plasticity in the ammoniator, directly affecting through put of the finished product.

Spencer cites production of a 12-12-12 at 10 tons per hour with these assumptions: Heat of reaction raises mixture temperature to 380° F., allowing for heat loss by moisture evaporation and by radiation; and optimum liquid phase at a constant moisture level is reached in the ammoniator at 190° F.

If the recycle temperature is 120° F., 27 tons per hour is needed to lower the ammoniator temperature to 190° F., but with a recycle temperature of 100° F., 21 tons per hour is needed. This 22 per cent reduction in recycle permits 12 tons per hour of finished



Cooler (Center-Background), which discharges into the finished product elevator.

product to be made without increased load on ammoniator, dryer, cooler, crusher or screens.

The 25 ton recycle hopper has a gravimetric feeder with maximum delivery of 54,000 pounds per hour discharging on the raw materials conveyor.

On-size material flows to a finished product belt conveyor equipped with a continuous weighing device. This belt also has a tripper so that certain grades can be delivered through the parting agent equipment.

The latter installation consists of a rotating drum, 5' dia. x 18' long, with specially designed mixing flights. Material to be coated flows down a chute and the parting agent is fed through a vibratory feeder. The drum discharges into an elevator that carries material back to the finished product conveyor.

Cost Information

What did all this cost? A total of some \$367,100. Process equipment ran \$204,300; the building, \$77,900; Labor (excluding contract for building siding), \$44,900; and engineering, \$25,000.

Spencer operational data sheets show production rates of from 8 to 15 tons per hour, recycle rates of 6.8 to 27.7 tons/hour and a total rate throughout of 16.8 to 42.7 tons per hour.

As an example of the materials used in formulation of a granulated mixture at the Ark-Mo plant, quantities of raw material used in producing a 14-14-14 material, without addition of ammonium sulfate, are: Nitrogen solution (Spensol C) (37 per cent N), 762 pounds/ton; 66° Bé sulfuric acid, 194 pounds; superphosphate (20 per cent P_2O_5 , wet basis), 210 pounds; triple super, 516 pounds; and potash (60 per cent K_2O), 468 pounds. The figures assume a 4.3 per cent degree of ammoniation and 8 per cent detachable water in the raw materials.

From 5 to 12 per cent of water is removed through drying in the granulation process, depending on formula and desired moisture content of the end product. Some companies have added 100 to 240 pounds of filler to adjust for the loss in weight, but Spencer points out that this increases cost of formulation while lowering maximum potential analysis.

A much better way, the firm comments, is to treat raw materials as though they had already lost the water—thus, in one way, increasing the plant food content.

Commenting briefly on subjects requiring more information, Spencer cited, among others, liquid distribution, depth of ammoniator bed, maximum allowable dryer temperature, maximum finished product moisture and the best parting or coating agents. ▲

Plant design was sparked by Earl Day (left), Ark-Mo; Jim MacArthur, Spencer; Arville Hicks, Ark-Mo.; Joe Sharp, Spencer.



Southern control officials hear V-C rep and Louisiana agronomist discuss

How to Reduce Excess Grades

EXCESSIVE numbers of permissible fertilizer grades were attacked by two speakers at the 13th annual convention of the Association of Southern Feed and Fertilizer Control Officials held in the Jung Hotel, New Orleans, La., June 22-24.

Frank E. Boyd, Virginia-Carolina Chemical corporation agronomist, provided a review of the grade situation in Southern states and showed that, in many cases, recommendations could be considerably reduced. Pointing out that experiment station data and official soil tests must be correlated to bring information to the farm level, Boyd added that the soil tester does not attempt to pin point his figures. With available phosphate, for example, low may mean anything below 50 pounds per acre, medium, 50-100 pounds and high, any amount above 100 pounds.

When recommendations are made for a high P-low K or other plant food mixture, he said, varying amounts of one grade plus side-dressing will meet the need.

Sturgis on Excessive Grades

The other speaker who commented on the grade situation was M. B. Sturgis, agronomist of the Louisiana agricultural experiment station. The situation is aggravated, he stated, by manufacturers with materials or special grades they wish to push. Control officials should help retard marketing of such products, he continued, until they have "been tested through demonstrations with county agents set up by the company's agronomist or have been tested by experiment station agronomists."

Too often, Sturgis added, the soil tester tries to fit his recommendation more precisely to variations in a given or very closely related soil type than is needed or desired—with the result of increased farm demand of unnecessary custom mixing. Recommendations should be made, he emphasized, in terms of established grades as well as in pounds per acre of nutrient elements.

On the other side of the picture are the control officials who, according to Sturgis, desire far too few

grades and materials. Agronomists in general, he indicated, are the purest of the interested groups with their work providing some ratios and grades that have become static. Sturgis admitted that some of these are too fixed—as the amount of plant food applied increases, the ratio must change.

In his excellent talk, V-C's Boyd provided this breakdown of the grade situation in Southern states:

Tennessee. There is no legal limit to the number of grades offered for sale, but the official soil testing laboratory has found that the approved list of 12 grades fills all needs of any soil or crop.

Most NPK fertilizer is sold in six grades, but the small tonnage mixtures sold during 1951-53, accounted for more than 10,000 tons—the output of two small factories.

Georgia. Although unlimited registration is permitted, practically all tonnage is supplied by a "mere handful of grades." The soil testing laboratory recommends from a list of 12 approved mixed fertilizer grades.

Alabama. This year, mixed goods registration is restricted to 12 grades. As in other states, almost all the tonnage is in half of the grades. The director of the state soil testing laboratory has stated that the state needs only four complete ratios or grades for practical coverage of all soils and crops.

North Carolina, Mississippi and others. Strict legal requirements have been set up governing permissible numbers of grades. All other states, according to Boyd, are working along similar lines with college and state departments of agriculture in cooperation with industry, determining suitable grades.

Louisiana. This state differs in that "experimental" grades are added to the approved list on a trial basis. In practice, said Boyd, this has led to abuses and multiplied problems in maintaining a reasonable grade list.

He illustrated the ease with which the large numbers of complete grades now permitted in Louisiana

could be reduced to four ratios, basing his figures on 1953 statistics:

1-1-1 ratio—four grades—47,380 tons sold. Average grade: 9-9-9. Suggest any 1-1-1 ratio.

1-3-3 ratio—six grades—50,306 tons sold. Average grade: 4-12-12. Suggest a 4-12-12.

1-2-3 ratio—two grades—1,141 tons sold. Average grade: 6-8-13. Suggest a 4-8-12.

1-3-2 ratio—12 grades—29,660 tons sold. Average grade: 5-14-6. Suggest a 4-12-8.

Thus, four ratios involving some 25 grades in 1953 could be cut to four grades that could be used for any purpose, as Boyd suggested, by varying application rates and adding a side-dressing.

He cited some of the advantages to both farmer and producer in reduced ratios and higher grades including a decreased price spread between high and low grades that should encourage farmers to follow recommendations; less cost per pound of plant food in higher analysis goods; less plant storage needed; savings in registration, printing, record keeping and chemical control; easier handling on the loading dock and the prospects of increased consumer confidence.

Control Problems Reviewed by Epps

Reviewing some of the problems of control work, E. A. Epps, Jr., Louisiana, the retiring SFFCO presi-

dent, revealed that a critical situation has developed in checking high analysis goods. Erratic analyses of samples are too frequently obtained, he reported, stating that it is believed "this is due to fundamental factors in the manufacturing operation."

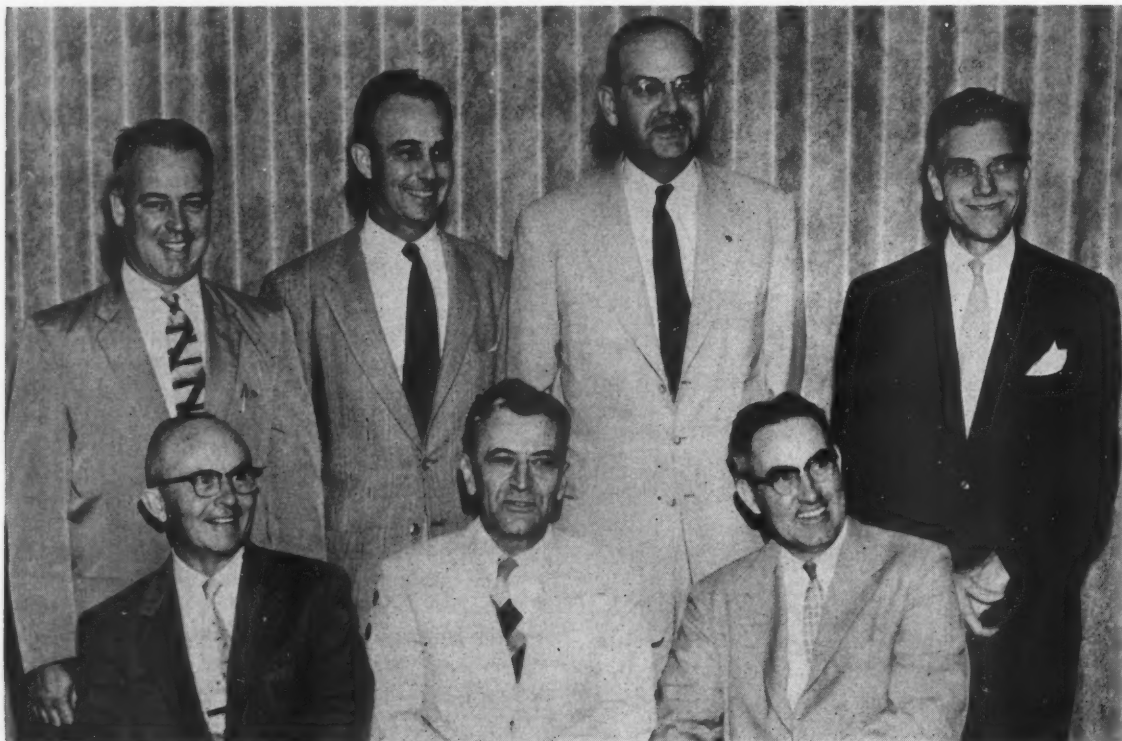
Epps told the convention gathering that his state has under consideration the reporting of fertilizers, pesticides and feeds as satisfactory when the analysis is within a reasonable tolerance.

Exact values obtained by the chemist, according to this plan, would be reported only in case of deficiencies. Epps pointed out that reporting a deficiency of .2 per cent in a fertilizer guaranteed to contain 8.0 per cent nitrogen might cause the consumer to feel that he was not getting full value even though the difference is well within tolerance for errors of sampling and analysis.

"The objectives of our work," he added, "can be achieved just as well by reporting as satisfactory all samples which meet legal requirements."

New officers elected at the New Orleans meeting include Dr. M. P. Etheredge, Mississippi, president; R. W. Ludwick, New Mexico, vice-president; and Bruce Poundstone, Kentucky, secretary-treasurer. N. L. Franklin, Virginia, was elected to the Executive committee and was named chairman of that group. Other members of the committee include: Epps; Bruce Cloaninger, South Carolina; H. H. Hoffman, Florida; and Dr. E. W. Constable, N. C. ▲

Executive committee, Southern Feed and Fertilizer Control Officials. Front row: R. W. Ludwick, vice president; Dr. M. P. Etheredge, president, and Bruce Poundstone, secretary-treasurer. Back row: E. A. Epps, Jr., past president; H. H. Hoffman, Bruce Cloaninger and N. F. Franklin. Also on the committee is Dr. E. W. Constable.



Researcher finds streptomycin-glycerine combination promising for bacterial blight of beans.

Merck's New Antibiotic Spray

CONTINUING its development of products in the crop protection field, Merck & company has announced the release of a new spray that combines streptomycin with glycerin in a formulation for agricultural use. Prior to this development Merck has been marketing streptomycin under the Agristrep trade name for use in control of bacterial spot of tomato and pepper, halo blight of beans, fire blight of apples and pears, walnut blight and other diseases.

This represents one answer to the need expressed by some experts for an agent, which, when combined with streptomycin, will prevent the antibiotic from being washed from the leaves by dew or rain.

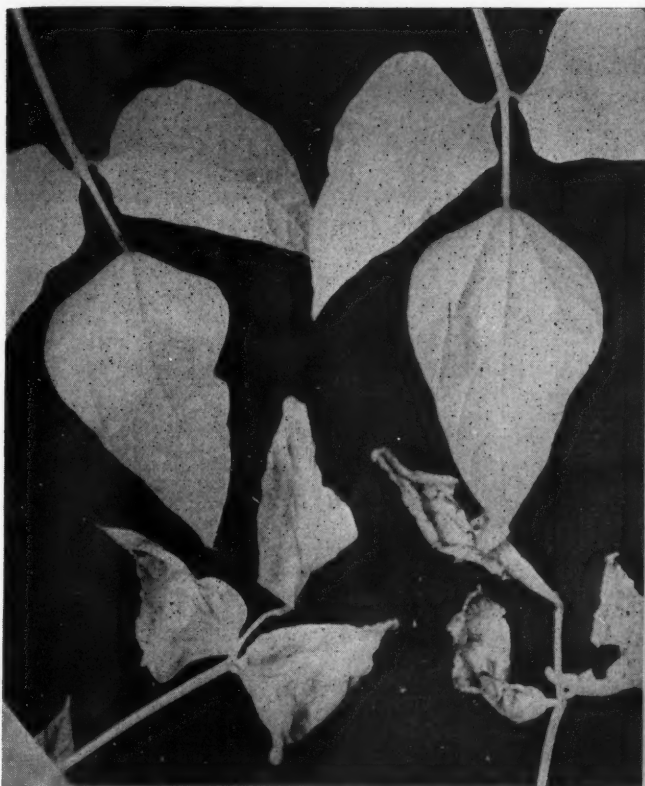
The new mixture shows promise in the control of common bacterial blight of beans—an accomplishment that had not been possible with materials formerly used.

The big advantage in this new combination is apparent in tests on Pinto beans that reproduce rain-storm conditions under which the antibiotic would be washed from the leaves. Although streptomycin alone, in concentrations high as 200 ppm, caused very little reduction in symptom development of bacterial blight, a solution of 50 ppm of the antibiotic and 1 per cent glycerin gave almost complete protection. This high degree of control was still evident two weeks after application.

At the end of the two week period, leaves on plants that received a combination treatment were green and healthy while those of plants sprayed with streptomycin alone had, for the most part, turned yellow and fallen from the plants.

In other tests where leaves were not washed, streptomycin was quite effective in two applications but again the combination sprays greatly increased degree of control.

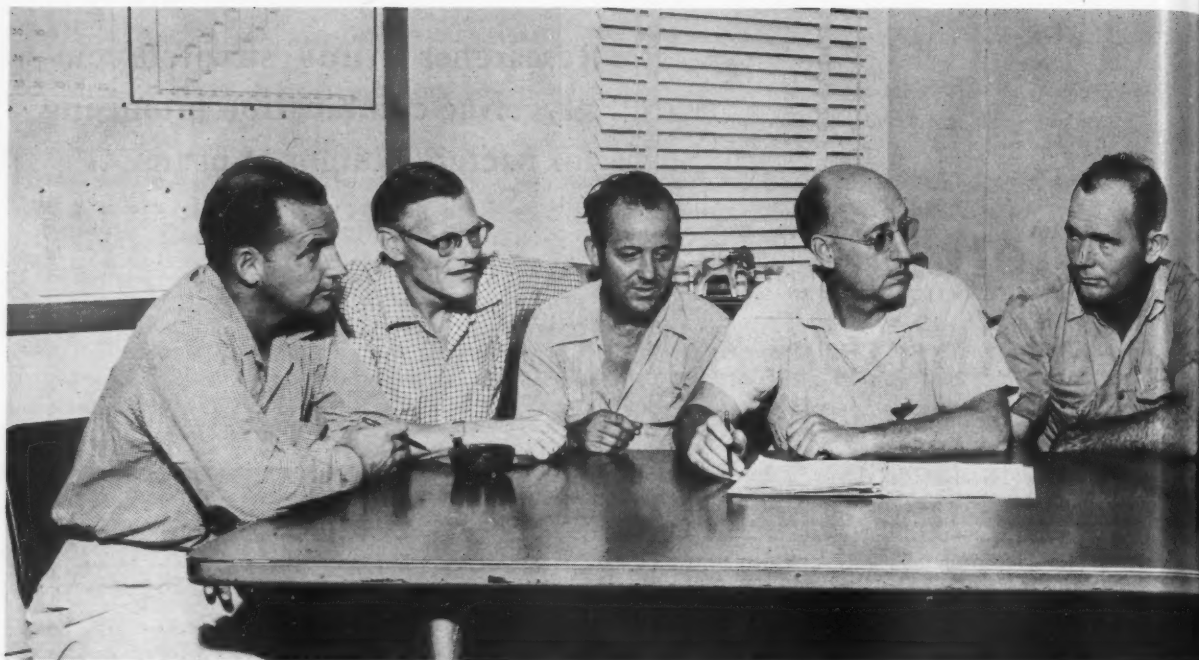
Dr. Reed A. Gray, a Merck plant physiologist, first noted the increased effectiveness of sprays with addition of glycerin and found that it was correlated with greater absorption of the streptomycin by the plant leaves. Although work is continuing on investigating the mechanics involved, it is felt that the



Effective blight control is evident in normal, leaves (above), sprayed with a glycerin-antibiotic formulation and inoculated with blight. Diseased leaves (below) were sprayed with antibiotic alone and inoculated.

addition of glycerin may serve to maintain moisture on the leaves, facilitating the absorption of antibiotic into the plant.

Dr. Gray sees other possibilities for the combination type spray in providing increased control of other disease organisms infesting various fruits and flowers. Considering only the bean blight, there is a six million dollar market now open, the total estimated loss per year due to the disease. Field tests are under way for complete evaluation of the glycerin-antibiotic mixture in the control of this disease. ▲



Davison's Prize-Winning Plant Committee Idea

By H. B. DeVinney

Director of Industrial Relations

Davison Chemical Company

Div. of W. R. Grace & Co.

LABOR-MANAGEMENT committees, as developed by our company, have had the objective of providing us with a sort of window with which to view what is going on in employees' minds, so that the little grievances, handled quickly and on the spot, can be prevented from becoming the big ones that lead to strikes.

Its success can perhaps be gauged from the fact that since the plan's inception in 1947, the company has enjoyed exceptionally good industrial relations. Although the problem is complicated, as in typical chemical companies, by the multiplicity of unions with which we deal, over the period of the plan's operation we have only a single work-stoppage and

that of short duration in a single city. We now operate 19 plants in as many areas with a total working force averaging more than 4,300 men and women. The majority of the plants produce fertilizer.

The plan won for the company the annual Award of Merit of the Associate Membership division, Research Institute of America.

Our Industrial Relations division was established as a top management function after World War II, and W. N. Watmough, Jr., now a vice president of the company, was placed in charge. By late 1945, the responsibility for negotiating labor agreements became of major importance. The end of the war had erased the "no strike" pledge, and many things had occurred to strengthen the position of the bargaining units.

During 1946, our Curtis Bay Works (Baltimore) was changing rapidly from war production to peacetime efforts. Transfers from one department to another, as well as reduction of the working force, resulted in an ever increasing series of grievances



Photo by Davison

Success of Davison's labor management committees is demonstrated by the record showing but a single, short work-stoppage in a single city since the plan was initiated in 1947. It won for the company the Award of Merit presented annually by the Research Institute of America.

that harassed both union and management. During contract negotiations with the local bargaining committee in August of 1947, the question of these transfers and promotions, resulting from the reduction of force during the previous year, were an important problem to be resolved. The discussions were heated and prolonged on both sides, but from them came a recognition of the basic problem: that a better understanding concerning the facts on the part of each of the interested parties, with respect to each individual situation, would help to prevent "the cut" from becoming a serious "wound."

Seniority Review Committee

It was at this point that Watmough came up with the idea of what was then known as the Seniority Review committee. The management proposed to include in the contract a committee composed of

Plant committee of the Florida Phosphate div., Bartow, Fla: J. E. Semmes, Jr., industrial relations manager; J. M. Haas, personnel supervisor; W. R. Hendrix, maintenance leaderman, triple superphosphate plant; chairman—A. J. Frost, chief engineer; secretary—D. M. Coker, mechanic 1st class, T/S plant; A. S. Byrum, production supervisor, T/S plant; Nolan Senn, maintenance leaderman, T/S plant and president of Local Number 39, I. C. W. U.

three employee members of the union and three representatives of management. Two representatives of each group were to become permanent members, and the third member pro tem to be assigned from the department involved in any dispute. Formal notice by the company and the union with respect to the identity of the permanent representatives was required, and a tenure of service for one year was specified.

Because Davison's seniority clause provides "that the company shall give due consideration to the qualifications and the seniority of the employees, and where the individual qualifications are relatively equal, those employees with the greatest amount of seniority shall receive the preference," the Seniority Review committee "shall be privileged to make a recommendation, if made within forty-eight (48) hours thereafter, by at least a majority vote, to the company with respect to its proposed action, and the company agrees to give consideration thereto before making its decision thereon." The review committee are furnished "with all the facts and circumstances surrounding the company's proposed action," but final decision rests with the management.

Union Accepts Proposal

The proposal was accepted by the Union and written into the contract. Considerable doubt was expressed by some members of management at the plant level as to the possible success of the review committee. However, at this writing, eight years later, it is still a part of the agreement, and the recommendations of the committee have never been challenged nor superseded by an overriding decision by the plant management. It definitely confirms the opinion that through knowledge comes understanding, and that people will never learn to get

... the Plant Committee Idea

along together unless they start being together and understanding the facts concerned with the other fellow's point of view.

This successful venture of the Seniority Review committee gave birth to the possibility of broadening the area of discussion with respect to other day-to-day problems in labor-management relations. With the growth of the corporation and the addition of new plants, the Industrial Relations division found itself with greater administrative responsibilities for more employees covered by more labor agreements. It also found that come time for negotiating new agreements, discussion related with the day-to-day administration of the agreements had piled up to the extent that an extraordinary amount of time and effort had to be devoted to discussing old complaints which should have been resolved months before. They had no place at the negotiating table, yet they were legitimate "gripes," in the opinion of the employee, that needed attention and understanding as they occurred, not a year or so after the fact.

In 1951, the writer, who had succeeded Watmough as head of the Industrial Relations division, decided to take the successful idea of the Seniority Review committee and reconstitute it into a Plant committee, as a working tool for management at the plant level, with broader areas for the discussion of facts and circumstances concerned with the functioning of the agreements. The first Plant committee was negotiated into the first agreement at that time, and plant committees have since been negotiated with the several bargaining units at all larger plants of the corporation.

Plant Committee Operation

The Plant committee, composed of three representatives appointed by the membership of the union and three representatives of management selected by the plant or division manager, is required to meet regularly each month. The committee, upon convening, selects its chairman and secretary. It may discuss anything that may pertain to the day-to-day in-plant problems concerned with the agreement except grievances. Grievances are taboo, and must be handled by the established procedure of the agreement. It is the practice for the management representatives to discuss the corporation's affairs and circumstances at these meetings. Minutes of each meeting must be kept and agreed to by the committee as a whole before signing by the representatives. Copies of the minutes of these meetings go to

the plant or division manager and to the director of industrial relations.

In the case of the plant manager, who may or may not be a representative on the committee but who may attend by invitation, it gives a month-to-month picture of the plant problems, as they may be envisaged by the employee. It directs his attention to the ideas of the employee and keeps current any and all problems concerned with the working of the agreement. It supplies a fluoroscope through which his delegated management personnel become better acquainted with the employee problems as they seem to exist or occur, and stimulates prompt action by the management, thereby preventing the "mole hill" from becoming the "mountain."

The director of industrial relations and his associates are currently informed at close range with respect to the functioning of the several agreements in each plant, permitting top management counsel when necessary, and action if critical circumstances are diagnosed.

Actions & Recommendations

The actions and recommendations of the committee have been mainly along these lines:

1. Work out a procedure for informing the employees of pending changes in operation practices, with explanations of reasons and prospective benefits of the changes.
2. Suggestions for changes in operating procedure in the interest of greater efficiency or more safety.
3. Recommendations for rescheduling of operations to avoid shut-downs and consequently to avoid unnecessary expense.
4. Full and frank discussion of causes of employee dissatisfaction, with recommendations for correction where feasible or otherwise for explanations as needed.

It is the opinion of Davison's top management that the Plant committee is a successful tool in the dynamic, fluid field of human relations. Marlin G. Geiger, our president, has said: "Although we all realize that the Plant committee idea cannot solve all of the problems pertaining to this relationship, it does provide a platform for a frank discussion of employee problems on a current basis and directs the attention of management to the necessity of effective and prompt effort in maintaining a better informed, more contented and more productive employee group." ▲



Yellow spot, the molybdenum deficiency disease in citrus causes severe defoliation and poor yields as shown in this Florida Citrus Experiment Station photograph.

Although principal uses are at the horticultural level, the agricultural outlook for moly is good in several areas. Molybdated mixed goods, sprays, dusts and seed treatments can be marketed.

A Fresh Look at Molybdenum Usage

IN THE seven years since molybdenum deficiency was first noted in the United States, much comment has appeared in professional and trade literature spurred by the success of agriculturists in Australia and New Zealand with applications on large scale pasture areas.

Now commercial usage has developed in Florida and New Jersey, and there appears to be considerable potential for the use of this essential element in other areas of the country. The initial deficiency here was found during 1948 and, two years later, a lack was noted in some New Jersey soils. At present a deficiency of molybdenum is known in some 11 states and is suspected in four others.

Primary commercial interest to date has been in materials for horticultural use—mostly in citrus and cauliflower growing, but also in production of florist and home-garden crops.

In Florida it is estimated that up to 50 per cent of the citrus acreage may be deficient in moly, and the Florida Citrus Commission recommends use of nutrient sprays for control of the symptomatic yellow spot. Growers are told to use one ounce of sodium molybdate per 100 gallons of water where deficiency is mild, two ounces in severe cases.

According to the commission, this material can be applied with lime-sulfur, wettable sulfur, DN dry mix, ovex, copper, zinc and manganese. Combi-

nations with oil or parathion are also good possibilities although such mixtures have not been thoroughly tested to date.

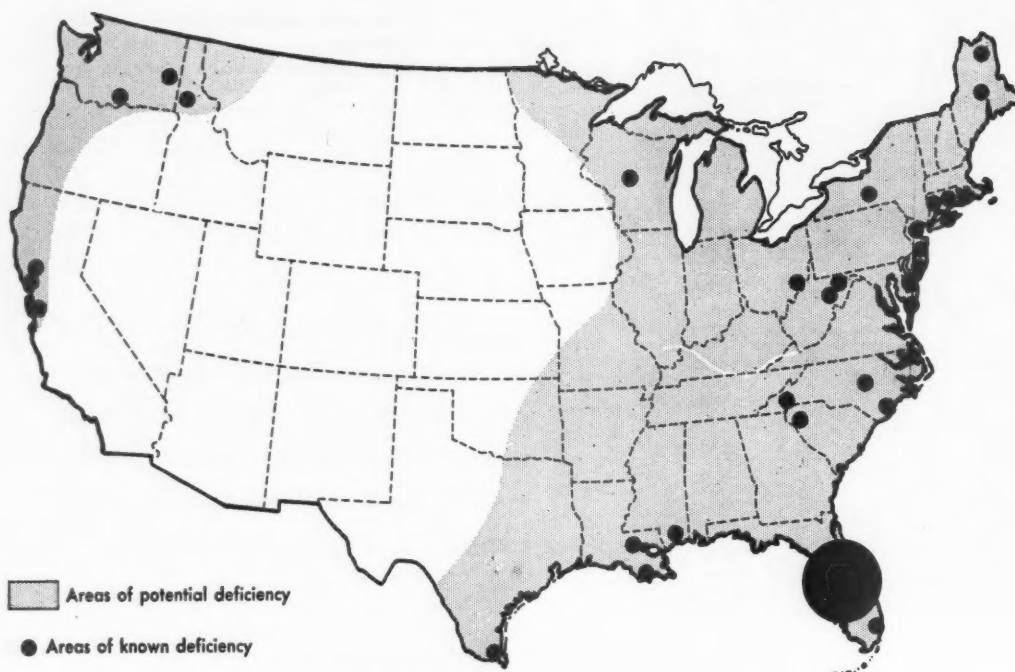
Applications should be made only to groves exhibiting yellow spot, and moly is best applied during spring and summer for regreening of the yellow spots. Sprays used in October or later will prevent the symptoms the following summer but will not regreen existing spots.

In New Jersey, Dr. E. R. Purvis, Rutgers University, cites two cases of apparent deficiencies—one occurring on alfalfa, especially on the heavier soils of that state, and the other on cauliflower when this crop is grown in rotation with potatoes, primarily on intermediate soils.

Some 95 per cent of the cauliflower on one 50 acre field, adds Purvis, was ruined by this deficiency. Another New Jersey observer has reported that he has seen the characteristic whiptail symptoms of moly deficiency on cauliflower for some 10 to 15 years.

On alfalfa, says Purvis, the situation is corrected by adding the nutrient to the seed prior to sowing. With cauliflower, one pound per acre can be placed on the field, or moly can be used on plants in the seed bed.

An interesting side-light pointed out by the Rutgers soil specialist is the fact that about 90 per cent



Molybdenum Deficiencies

of the known areas deficient in molybdenum have also been shown lacking in boron—an occurrence attributed to cropping practices.

Elsewhere in the Northeast, termed a very promising area for molybdenum usage by Dr. Charles Kline, manager of chemical development for Climax Molybdenum company, development has been relatively slow. Although deficiencies have been found in all states but Massachusetts, New Hampshire, Pennsylvania and Vermont, research by Eastern States Farmers Exchange has shown no present need for addition of moly to fertilizers used within its market area.

Dr. J. A. Chucka reports that Eastern States has tested moly on legume seeds in greenhouse plots and has surveyed various forage crops, analyzing the molybdenum content. To date no serious deficiencies have been uncovered, but the farmers' cooperative plans to watch closely for deficiency symptoms.

In a telephone conversation with this reporter, Dr. Chucka added that Eastern States intends to analyze various materials used in their fertilizer production to determine the moly content of each.

This has been done, in part, at other locations, and one USDA researcher has found that our Western phosphates contain a moderately high quantity of the trace element. This, however, is not true of Eastern phosphate materials.

Alfalfa in the Northwest

In another area of major molybdenum deficiency, the alfalfa growing area around Portland, Ore., use

of the trace element is beginning to grow rapidly. Dr. H. M. Reisenauer, associate professor of soils at the State College of Washington, estimated that consumption of molybdate materials could reach five to 10 tons per year within two to three years, based on anticipated farm usage in areas now known to be responsive to the element.

He states that two areas are now known in which alfalfa growth and protein content are increased with molybdenum. In one of these sections application of sulfur, boron and molybdenum is required for maximum alfalfa hay yields. Sulfur is the most limiting but additional increases are obtained only if the other two plant foods are also applied.

The soils department has suggested that a borated molybdenized gypsum might be prepared for use in the area. The material would contain 10 per cent borax equivalent and one half per cent sodium molybdate equivalent with a recommended application rate of 200 pounds per acre. Thus 30 pounds of sulfur, 20 of borax and one half of sodium molybdate would be added to each acre.

Reisenauer does not believe such a material was prepared or used last year although a small acreage was treated from the air with sodium molybdate.

Other states in which definite deficiencies have been located and in which commercial usage may develop include Idaho, Texas, Louisiana, Mississippi, North and South Carolina, Wisconsin, Ohio, West Virginia, Rhode Island, Connecticut, Maryland, and Delaware.

Dr. Albert E. Kretschmer, Jr., of the Everglades Experiment Station, Belle Glade, Fla., in a recent

molybdenum symposium at Johns Hopkins University, reported that about 35 moly-starved areas have been found in this country, over 20 uncovered within the past two years. All are located in the East, Pacific Northwest or along the Gulf coast.

Molybated Products

How are American fertilizer producers using molybdenum at present? Davison Chemical's Dr. Vincent Sauchelli reports that his firm is adding molybdate to its Nurish 20-20-20 all-soluble fertilizer, a mixture that also contains manganese, zinc, copper and boron. The formulation is sold through the specialty trade and dealers to reach horticultural and garden users, including Florida truck growers.

To obtain the necessary thorough mixing, Davison uses a blender, a not-unusual method when dealing with what Sauchelli aptly terms "pharmaceutical" mixtures.

Kapco division of Summers Fertilizer company is another producer with molybdated products on the market. In these mixes, however, moly is not added singly but is contained in a micro-nutrient blend of chelated compounds tradenamed Nutramin and produced by Davies Nitrate company. Much of the Kapco production is sold to commercial growers of horticultural crops and to florists.

Although the Davies Nitrate material is used in some farm products the price restricts primary applications to specialty materials such as those produced by Kapco.

If and when it is determined moly should be added to fertilizers for farm use in specific areas, it would seem that a problem similar to that of fertilizer-pesticide combinations might be encountered. Mixing the very small amount per ton needed to correct

most deficiencies, often only 24 ounces of molybdate, would require careful preparation.

It has been suggested that the trade take a page from the manual of feed manufacturers who are fully accustomed to adding minute quantities of antibiotics and other materials to their products.

Dr. Chucka cited an example in which his organization adds only a few grams of cobalt per ton of feed with very satisfactory results. In this operation, the cobalt is thoroughly mixed with just one of the major ingredients, then this combination is blended with the remainder of the contents to produce the finished material.

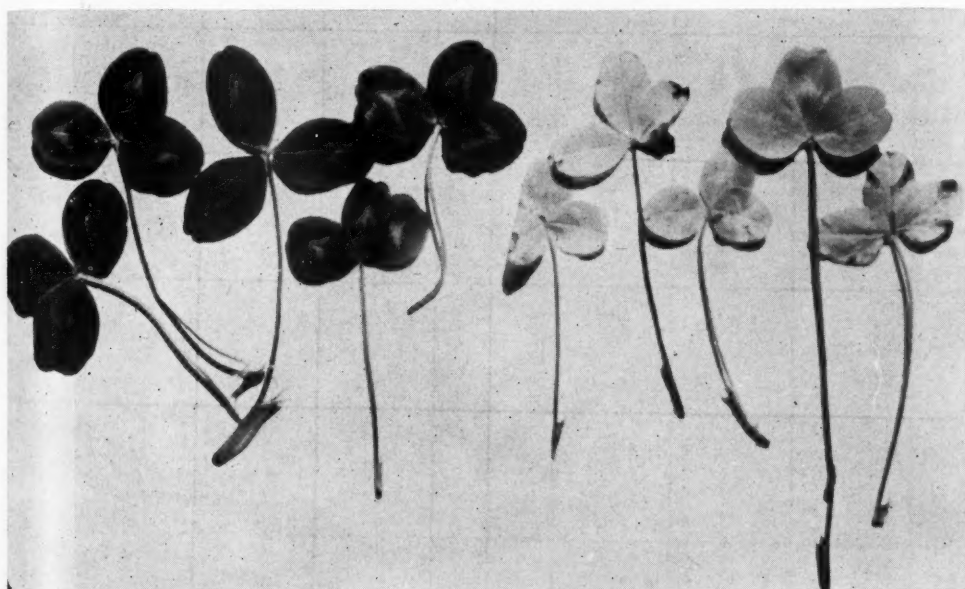
In Australia and New Zealand there appears to be a different attitude towards blending methods than the general opinion here so evident in fertilizer-pesticide mixes discussions.

Your editor was fortunate in being given the opportunity to discuss, a few weeks ago, this and other phases of moly usage with Dr. Alfred J. Anderson, the Australian agronomist who first demonstrated the commercial value of moly applications.

Mixing by Australian manufacturers, primarily superphosphate producers, has been most satisfactory according to Anderson. One company uses a method that might be questioned here—spraying a solution of sodium molybdate on the superphosphate as the latter material passes on a belt, just before a hopper delivering to the bagging station.

Another Down Under superphosphate producer uses a method that provides a much more positive distribution, placing the moly in sulfuric acid prior to acidulation of phosphate rock.

Not only forage crops but other plants such as flax, vegetables and even cereals are treated with moly in Australia, and use of the trace element is



Legumes require moly for N fixation. Pale white clover plants at right deficient in moly, contrast with healthy plants (left) grown with sufficient moly.

so well established that in that country and New Zealand over one million acres have been treated.

The molybdated superphosphate is applied with ordinary application equipment, although in New Zealand, aerial topdressing is widely used. In 1953-54, nearly 25 per cent of all fertilizer used in that country was applied by air.

This has made possible the development of improved pastures in rough hill country which could not be economically limed. Clover is often seeded in the same operation and, where small quantities of limestone are needed, the three ingredients are applied together at a total cost for materials and application of about \$5. per acre.

Other Factors

The use of moly as a replacement for or supplement to liming is a big factor in development in Australia-New Zealand and will be of increasing interest here.

Dr. Firman E. Bear has pointed out that the release of molybdenum may be one of the important functions of liming, raising the question of whether or not a few ounces of the trace element might substitute for the second or third ton of limestone now commonly applied to an acre of crop land.

Moly should be used with care, however, for excessive quantities in the soil can be troublesome. Dr. Chucka has pointed out that over 10 ppm of molybdenum in forage is toxic to dairy cattle.

A direct relationship has been established between

the soil content of molybdenum and copper so that moly poisoning can be prevented or cured by the use of copper. Where copper is present in excessive quantities, addition of moly will counteract the toxic effect.

Dr. Anderson expressed it this way—"moly acts against copper provided inorganic sulfate is not deficient. Copper poisoning is treated by adding molybdenum plus sulfate."

Deficient Soil Types

Deficiencies usually occur under one of four soil conditions: Soils high in iron oxides (red loams and clays, lateritic types); high in available manganese; on areas newly brought into cultivation from pasture or waste; and soils heavily dressed with sulfates.

Manganese has been found to interfere with uptake of molybdenum by the plant, and soils with a high content of available manganese may require higher moly applications than any other type.

Where soils are highly productive and fertile or have been heavily limed or manured, deficiencies are unlikely to occur. This is also true of alkaline soils in regions of low rainfall and on peat and muck soil types.

It is removed from soils by leaching and may be at low levels in coastal sands and hill country soils. Heavy cropping causes moly loss, especially with cereals, and long-continued application of phosphates has a similar effect.

As the soil becomes more alkaline, some neutral

Dr. W. D. McElroy (right) director of McCollum-Pratt Institute for trace metal research welcomes Drs. Alick T. Dick (left) and Alfred J. Anderson (center) of Australia to conference on molybdenum in nitrogen utilization.



or alkaline soils derived from limestone or serpentine have lost most of their original moly content. Climax Molybdenum reports one case of deficiency said to occur on a soil containing 70 per cent calcium carbonate.

Deficiency Symptoms

If deficiencies are suspected in your area, look for these general symptoms, remembering that plants usually do not grow well when molybdenum starved:

Legumes. Stunted and pale-yellowish-green, difficult to establish, quick to die. Fields often have a mottled appearance with crops growing well in some places, not in others. Symptoms are especially apt to occur on alfalfa which has, apparently, a high moly requirement.

On pastures, growth may be good only in urine patches where nitrogen is supplied that nodule bacteria of deficient plants cannot fix from the soil atmosphere.

Vegetable crops. Leaves of young plants turn pale yellow-green between veins, sometimes around the margins, with veins remaining green. The affected areas may develop into clearly defined spots often with a water-soaked appearance, later turning bright yellow, finally dying and turning a dead brown. In early stages of development, leaves tend to curl upward around the rim with a "cupped" appearance.

Moly-deficient peas, beans and other legumes given fertilizer nitrogen develop symptoms characteristic of other vegetable crops rather than the typical N starvation symptoms of legumes that provide their own nitrogen.

Whiptail, mentioned earlier on New Jersey cauliflower, is characteristic of the later stage of deficiency in cruciferous crops. Younger leaves are long and narrow, often very irregularly shaped; leaf tissue does not develop normally from the mid-rib which may be bare in spots; sometimes the tissue has a ruffled, almost pleated appearance.

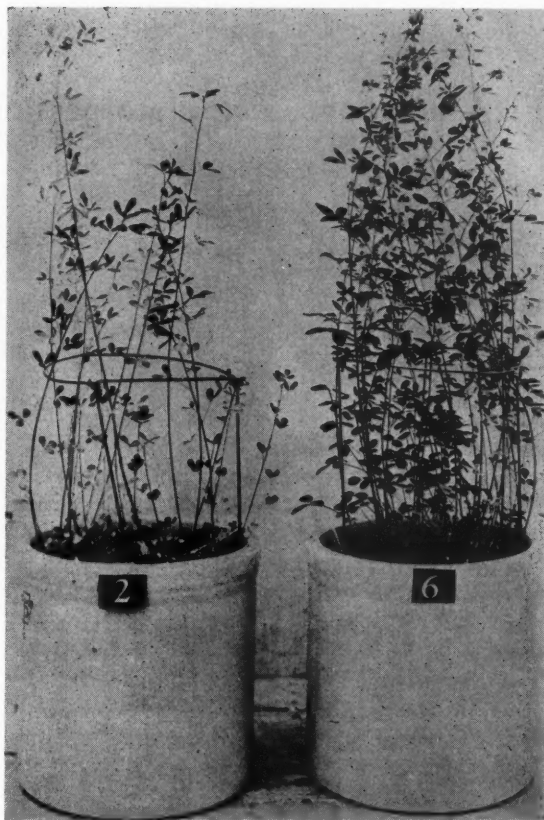
Grains and grasses. Have a low moly requirement but in severely deficient areas show primarily stunting and yellowing. Wheat and oats are small and yellowish, in oats the grain is pinched and the outer glumes become bluish. Corn plants are also yellowish with lower leaves scorched.

Ornamentals. Roses, hibiscus, marigolds carnations, sunflowers and others are stunted and yellow, dead spots develop between veins and leaf margins are scorched. Similar symptoms are found on citrus and plum.

What to Buy & Sell

Once a definite deficiency has been established you can consider supplying growers with molybdated

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Alfalfa grown on molybdenum-deficient soil in New Jersey. Soil in the pot at left was untreated; that at the right had molybdenum added. (photo by N.J. AES)

products in mixed fertilizers, sprays, combinations with inert carriers for aerial dusting and in liquid or dust preparations for seed treating.

Sodium molybdate is the most used molybdenum compound for fertilizer purposes. It is the simplest water soluble moly chemical and is the cheapest form for plant food use. Technical molybdic oxide, chemical grade, can be used directly in fertilizers and is the basic raw material for production of most other moly chemicals. Ammonium molybdate can also be considered.

The sodium salt runs about 75-90 cents per pound in drum lots, thus material cost of treating an acre of pasture at 2.5 ounces is only 15 cents, and on fruits and vegetable crops where eight ounces to a pound per acre are ordinarily used, the cost will run 40 to 90 cents for materials.

One caution for sales managers and field men from Dr. Sauchelli—don't confuse molybdenum (Mo), magnesium (Mg) and manganese (Mn). For those whose long-hand approaches illegibility, it is suggested that the full names be used for each or the short form "moly" for molybdenum. It only takes a few seconds longer and you will be sure that the proper material is ordered and delivered. ▲

FDA postpones complete pesticide controls until 1956 season.

By George Peters

Tolerance Extension Granted

CHANGES in the regulatory outlook for agricultural pesticides have now postponed final, complete control until the start of the 1956 growing season. By that time, Food and Drug Administration expects to have settled most of the problems raised by the Miller pesticide chemicals amendment to the Federal Food, Drug and Cosmetic Act. These include tolerances, handling fees and pesticide recommendations by the Hobby committee on FDA enforcement.

Tolerance Extensions

Behind the decision to put off till next season the beginning of fully effective control is extension of the original July 22 deadline on many chemicals through this Oct. 31. Officials didn't want to force growers to switch practices right in the middle of the growing season. This means the effective date on chemicals which have not received a tolerance is now on a product-by-product basis.

Outside the extensions, hundreds of tolerances for residues of pesticide chemicals and some exemptions went into effect July 22. These had already received

tolerances or exemptions. But for many other chemicals in use in agriculture, tolerances had not been set. Petitioners were given permission to continue using 57 of these on certain crops through this October 31. Officials warn, however, that the extension merely postpones the effective date of the law. Tolerances still are not likely to be granted for most of them.

The chemicals are: Acrylonitrile, aldrin, benzene hexachloride, butoxy polypropylene glycol, calcium cyanamide, calcium cyanide as a grain fumigant, carbon bisulfide, carbon tetrachloride, captan, chlorodane, chlorobenzilate, chloropicrin, copper carbonate-basic, DDT, dieldrin, endrin, EPN, ethyl dibromide as a grain fumigant, ethylene dichloride as a grain fumigant, ferbam, heptachlor, hydrocyanic acid, karathane, Karmex DW, Karmex W, lindane, malathion, maleic hydrazide, maneb, methoxychlor, methyl bromide, ovotran, parathion, phygon, piperonyl butoxide, potassium cyanate, sodium orthophenylphenate tetrahydrate, sulfoxide, sulphenone, systox, TDE, toxaphene, trichloroethane, zineb and ziram.

Also extended were: Alkyl dimethyl benzyl ammonium chloride, allethrin, chloro IPC, dimite, ethylene dichloride, piperonyl butoxide, sodium dimethyl dithiocarbamate, trichloroethane, diphenyl. More may be coming as we go to press.

Beginning November 1, however, no residue of any of the above chemicals may remain on any raw farm commodity in interstate commerce unless there has been a tolerance set and the residue is within its limit or unless an exemption from the necessity for a tolerance has been granted.

Current actions by FDA is perhaps your best guide in planning for next year. The clue is in official warnings now going out to states to prepare spray schedules for the 1956 growing season which require (1) pesticide uses that leave no residue at harvest or (2) only the use of chemicals for which tolerances or exemptions have been granted. The official stand now is that further extensions of the final effective date of the Miller law would only lead to confusion in 1956.

One concession: In case farm commodities containing residues extended to November 1 are marketed after the season, FDA has promised not to consider them adulterated—provided it was legal to move them in interstate before that date.

Meantime, the first contest over the new tolerances to be carried outside FDA is over aramite. The

tolerance set for this chemical is zero. Manufacturers differ with it, content a slight residue is safe. Under provisions of the new law, they have called on the Secretary of Health, Education and Welfare to refer the controversy to an independent advisory committee of experts for review and comment.

Other new tolerances are to come and some have been established. Heptachlor has received a tolerance of a 10th of a part ppm for certain crops. A tolerance of 20 parts ppm has been set for captan for certain crops. Both are chemicals on which the effective date has been extended.

Hanging fire: FDA still has a little over 30 petitions on file for exemptions or changes in tolerances, some of which are among those extended. The chemicals are aldrin, dieldrin, systox, chlorobenzilate, phygon, Karmex W and Karmex DW, malathion, aldrin and maneb. Officials promise decisions on them will be reached as fast as studies become final.

Companies which have filed for changes in the rules for these chemicals include American Cyanamid company, Chemagro corporation, Shell Chemical corporation, U.S. Rubber company, Geigy Chemical corporation, all of New York City. Other companies are Velsicol corporation, Chicago; California Spray-Chemical corporation, Richmond, Calif.; Stauffer Chemical company, Chauncey, N. Y.; E. I. duPont de Nemours & company, Inc., Wilmington; Food Machinery and Chemical corporation, Middleport, N. Y.

Administrative Handling of Fees

FDA already has made two important changes in the regulatory fee set-up which affect manufacturers' costs and therefore the price of pesticides. Both soften the original absolute requirement of a \$500 deposit for each petition for an exemption or temporary exemption from a tolerance or amendment or repeal of a tolerance or exemption.

The absolute requirement is now waived:

1. When in connection with the change requested, a petition is also filed for a new tolerance to take the place of the old one and a deposit for the new one is made. Object here is to save paying double for what is really a single operation.

2. When a request is made for a temporary tolerance and the chemical already has a tolerance for other uses at the same numerical level. In such a case a lower deposit of \$50 plus \$50 for each commodity on which it is to be used will be the rule. This is to save charging high fees for work which already has been partly done.

Officials advise that other relaxations are being considered to meet industry demands for a fee structure better geared to the various services performed. These will be announced from time to time as agency experience in administering the new law

is gained. Officials stress, however, that in line with policy laid down by the Budget Bureau and the Miller amendment, the costs of processing new tolerances must be borne by the petitioner.

14-Member Committee on FDA Enforcement

Figuring importantly in the regulatory prospect ahead will be the findings of the 14-member citizens committee established recently to report to the HEW on enforcement of FDA regulations. The committee has recommended greatly increased funds to help the agency handle the additional workload put upon it by the recent Miller amendment.

"Woefully inadequate," is the committee's description of present FDA resources. To carry out the new pesticide regulations, the committee recommends that (1) FDA obtain more facilities and personnel to develop competent analytical techniques, (2) work with industry to define reasonable and more realistic toxicity levels and (3) train its field personnel how to apply the standards arrived at.

For this and other expansion moves, the agency should get a 10 to 20 per cent increase in its next budget. Business executives and others on the committee emphasize that enforcement weakness today is as much a threat to industry as well as the general public. Laxity in carrying out labelled directions for using pesticides means chemical industry prestige suffers along with the public health. Lack of sufficient technical help in the agency to process applications rapidly as possible may mean millions of dollars in postponed sales.

Committee findings call for an expansion of a FDA to about four times its present strength within 5 to 10 years. The group estimates the agency already is 1,000 inspectors under staff needs. Despite continuous advances in the use of chemicals in agriculture, FDA at present has fewer enforcement per U. S. citizen than it had 14 years ago, the committee says.

Washington political veterans consider the report is what the agency has needed to arouse more interest in Congress in a streamlined FDA. While the report is still being studied by the agency itself, there is little doubt that it will second most of the committee's recommendations. Their adoption, however, will depend mostly on Congress.

Pesticide Regulations at Farm Level

Agricultural Extension Service arm of USDA is stepping up its educational activity in the uses of pesticides to smooth the change-over under the Miller law. Top advice to growers still is: Follow the directions on the label. The department is also cautioning growers to use only pesticides manufactured by a reliable concern bearing an approved label.



USDA Photo

Heckathorn Supplies Western Spray Projects

THIS YEAR, Heckathorn & company, Richmond, Calif., is playing a big part in some major pest control operations in the western states. To date it has supplied the insecticides used in spraying some 618,000 acres of forest for spruce budworm control and is also formulating the material for grasshopper control on over 572,000 acres.

Under the direct supervision of President E. S. Heckathorn, assisted by E. G. Trimpey, operations manager, the company supplied DDT to planes working from four New Mexico landing strips to spray 450,000 acres of forest in budworm control efforts.

A complete manufacturing plant was set up in Albuquerque, including a laboratory operated by James Brodie, chief chemist. Most of the storage tanks, pumps and metering equipment was obtained locally, although some was brought in from Richmond.

Three aerial spraying contractors, Central Aircraft corp., Yakima, Wash.; Johnson Flying Service, Missoula, Mont.; and Ace Flying Service, Salem, Ore., worked from air strips at Tres Piedras, Santa Fe Municipal Airport, Cuba and Dyvad. Using multi-engine aircraft—PBY's, Ford Tri-Motors and D-18's, their pilots flew about 100 feet over tree top level to release one pound of DDT in a gallon of fuel oil per acre.

It was expected that the application would reduce

spruce budworm infestation by 97 to 99 per cent without danger to animals or birds. Special attention was given to bee colonies and fish hatcheries.

Project Director Jim Egan and Chief Biologist Dr. Carl Massey, head of the Albuquerque Forest Insect and Disease Laboratory at the Rocky Mountain Experiment Station, determined the correct time for spraying operations through daily collections and reports from biologists, radiomen and their aides.

Beginning the first of July, a similar operation took place in Montana in an effort to control the budworm on some 168,000 acres of forest. The Richmond company transported personnel and equipment to Missoula to formulate the insecticide and the planes flew from Hamilton and Gardner under the direction of the U.S. Forest Service.

Formulation of insecticides for summer grasshopper control work has also been undertaken by Heckathorn. A New Mexico program involving over 350,000 acres is the first operation scheduled and will be directed by Jim R. Dutton, USDA Agricultural Research Service, headquartered in Denver, Colo. For this project, the pesticide concern will supply Shell Chemical's aldrin at two ounces per gallon.

Heckathorn will also provide the material for three other major grasshopper control programs covering 41,000 acres in Nevada, 131,000 acres in Utah and 50,000 acres in Montana. ▲

Chemicals

New Liquid Fertilizer Released by Schrock

Schrock Fertilizer Service has added a new line of liquid fertilizers—Liqui-Green with Leaf-tone. A formulation of NPK with secondary and trace elements, it is being produced at Congerville, Ill., the main office location, and at Bern, Kan. Leaf-tone is termed a chemical added to facilitate leaf absorption and to prevent burning when directions are followed.

The mixture will be put up in 55 gallon drums for marketing through custom lawn spraying services, and smaller retail sizes will be available for sale through dealers and distributors for the home garden trade.

Commercial Thiophene Marketed by Sharples

Thiophene, a versatile heterocyclic sulfur compound, is now being supplied in commercial quantities by Sharples Chemicals Inc., a Pennsalt subsidiary, for use in the manufacture of pharmaceuticals and dyes. It is expected that the material will soon be widely used in agricultural and photographic chemicals, plastics, rubber, resins.

Calspray Shipment to Central America

California Spray-Chemical corp. has sent a 700-ton shipment of insecticide dusts and sprays to El Salvador and Nicaragua. The large shipment was reported caused by the growing cotton production in these countries.

Amide Content Upped In New Ninol Series

By a modification of the basic process used in manufacturing

alkylolamide detergents, Ninol Laboratories reports it has now become possible to increase the amide content of the amide condensates to about 90-95 per cent. As a result, the firm says its new series of detergents, called Ninol "Extra" series, exhibits higher foam stabilizing and thickening properties.

Mosquitoes Checked With Org. Phosphates

Research with water-soluble insecticides is offering real hope for the control of mosquitoes that breed in irrigation water, according to USDA.

Laboratory studies at the department's Entomology Research Station in Orlando indicate that dilute water solutions of several organic phosphate insecticides will effectively destroy mosquito larvae, and preliminary results from field-scale tests with Bayer L 13/59 thus far substantiate laboratory findings.

U S Rubber Files New, Amended Petitions

United States Rubber co. has withdrawn a petition for a tolerance of 5 ppm for residues of Aramite, 2-(p-tert-butylphenoxy)-isopropyl-2-chloroethyl sulfite, on certain specified crops, and 2 ppm for certain other crops. An amended petition has been substituted, asking a tolerance of 1 ppm on alfalfa, apples, blueberries, cantaloupe, celery, cucumbers, grapes, grapefruit, lemons, muskmelon, oranges, peaches, pears, plums, soybeans, sweet corn, tomatoes, watermelons, green beans, raspberries and strawberries.

A petition has been filed by the company proposing a tolerance of 3 ppm for Phygon (dichloro or 2,3-dichloro-1,4-naphthoquinone) on celery and tomatoes.

Improved Method of Residue Detection

University of California entomologists have discovered an improved means of detecting poison residues in food, based on a purification process developed by William M. Hoskins, entomology and parasitology professor, and two assistants, W. R. Erwin and Dora Schiller.

The researchers found that in fly bio-assaying, their laboratory flies died as often from waxy or oil substances, harmless to man, obtained from foodstuffs during extraction as from the actual insecticides.

By using acetonitrile as the washing agent they found that flies could be exposed to known quantities of toxicants, calculating the number killed and comparing this with the kill resulting from spinach, green bean or other residues. Hoskins and his associates have been able, with this method, to detect some materials previously not indicated by chemical tests.

The technique offers to canners, says Hoskins, basis for development of a faster, cheaper, more sensitive and reasonable accurate method of determining pesticide residues.

CMU Weed Control On Gladiolus Beds

Good control of weeds with CMU on gladiolus test plots has been reported by W. E. Larmie, floriculturist at the University of Rhode Island, without damage to the flower plants.

Another chemical, chloro-IPC, also gave good weed control, said Larmie, but seemed to injure the gladiolus slightly.

CMU had no apparent effect on the length of flower stems or time of bloom, and there was very little difference in corm weight and cormel production between the check plots and those treated with CMU.

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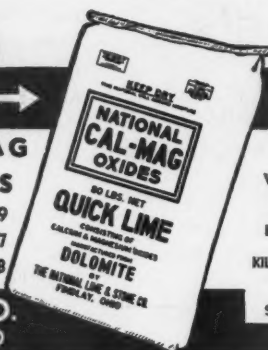
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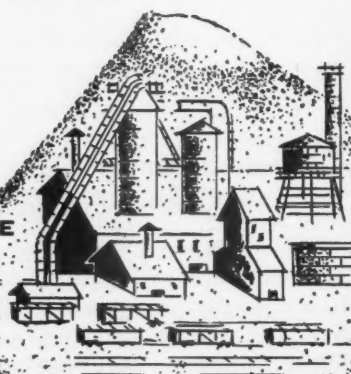
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Equipment & Supplies

Fulton Bag Launches New Burlap Promotion

Coordinated promotion soon will be launched by Fulton Bag & Cotton Mills and Rit Dyes in connection with the reuse and home dyeing of burlap bags.

Featuring Rit color suggestions as well as pattern ideas recommended by Fashion Consultant Sally Fulton, the promotion should create a new sales impetus in the field of burlap bags, states Fulton.

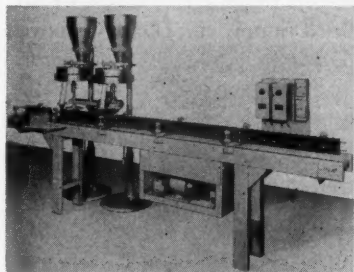
Greenville Hopper 70 ton RR Cars

A new standardized 70-ton covered hopper railroad car has been developed by Greenville Steel Car co. for bulk transportation of potash and other materials which must be kept dry.

The company's Greenville, Pa. plant is now working on an order of 100 of these new cars for the Western Maryland Railroad.

RS-310 Fillmaster Multiple-head Unit

Stuyvesant Engineering co.'s new fully automatic multiple-head Fillmaster unit fills accurately any dry, semi-dry, free or slow flowing products into any



type rigid containers at speeds up to 240 per minute, reports the manufacturer.

The operator deposits empty

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containers on the right hand end of the conveyor. Conveyor belt carries them along between rails to the filling heads, where each container is automatically stopped, filled and moved along gently to the left end of conveyor, ready for capping.

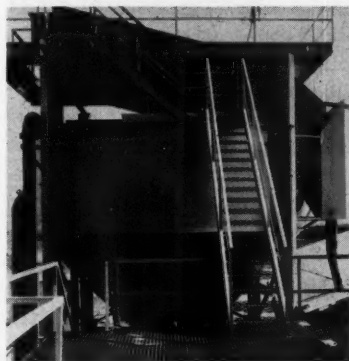
Stuyvesant says the unit can also be used to fill two different products, or more than two with additional heads, into the same container.

For details on the Fillmaster, circle 310 on Reader Service card.

RS-311 Open Steel Flooring & Treads

Between 18,000 and 20,000 sq. ft. of open steel flooring and several hundred stair treads were required for two buildings of Armour & co.'s new phosphate recovery plant at Bartow, Fla., reports Penn Metal company.

Penn Machine reports that the method used in fabrication of the



stair treads was unique. Each tread is a single piece of 4.27 lb. expanded metal turned to a 90° angle at the front and rear edges. This forms a kick plate and strengthens the tread. The company estimates that cost of these treads is about 70 per cent of the cost of bar-type treads of similar strength.

For more details, circle 311 on the Reader Service card.

RS-312 Michigan 12B Tractor-Shovel

A 15 cubic foot capacity tractor shovel, for in-plant handling of bulk materials has been added to the Michigan line by the Construction Machinery div. of Clark Equipment co.

Like larger units in the Michigan line, the Model 12B features a power-shift transmission, a



torque converter with 3 to 1 torque multiplication, a planetary wheel axle and low level bucket action.

Among the 12B's dust protection features are a filter for torque converter oil and power shift transmission oil and a partial flow filter to protect engine lube oil. Transmission, torque converter, starting motor, distributor and generator are all sealed.

There is a single power-shift lever on the steering column. With outside width of 4 ft. 2 in., the bucket will handle 1,500 lbs. while traveling 5.6 mph. The new model features Michigan's low level bucket action, with 38° tip-back at a carrying height of four inches above ground. At 5 feet maximum dumping height the bucket reaches an 48.5° angle.

Overall, the tractor shovel is 5 ft. 1 in. high over the pivot tube, 4 ft. 2 in. wide at front hubs and 10 ft. 8 in. long with bucket on the ground. It has a 4 ft. 3 in. wheelbase.

For more information, circle 312 on the Reader Service card.

RS-313 Hough Adds Largest Payloader

The third and largest of the new four-wheel-drive tractor shovels added to the Payloader line has been released by The Frank G. Hough co.

Designated as model HO, this newest unit has a capacity of two cubic yards and is similar in styling and outward appearance to the 1 and 1½ cubic yard models HU and HH which were recently introduced.

Featuring "pry-out" bucket action; 40 degrees of breakout at ground level, new safety and stability standards, the HO also has a newly developed complete power-shift transmission.

Hough reports that not only has the clutch pedal been eliminated but the power-shift is labeled "complete" because all shifts through all speed ranges in



both forward and reverse can be made without coming to a stop or even slowing down.

The HO is also said to have greater horsepower and more weight in relation to the two cubic yard capacity than other standard makes. Lifting and dumping height is greater than average and the new model is available with either gasoline or diesel power.

Further information may be obtained by circling 313 on the Reader Service card.

RS-314 New Pre-Fab Wonder Buildings

Development of a new straight-wall pre-fabricated steel building designed to meet storage and

warehousing needs of farm chemicals is announced by Wonder Building Corp. of America's Engineering & Research div.

The building can be erected in a matter of hours by as few as



two workers using nut and bolt fasteners. Erection costs are said to average 30 cents per square foot and purchase costs \$1.25 per square foot for a building complete with ends, doors and all necessary hardware.

The structure is designed to meet all building code requirements and will withstand wind velocities up to 125 mph.

For further information, circle 314 on Reader Service card.

Suppliers' Briefs

The Frank G. Hough co. has appointed Robert J. Sudlow as district representative in the New England states assisting distributors in sale and servicing of Payloader tractor-shovels. Sudlow resides at Niantic, Conn.

Hudson Pulp & Paper co. has acquired the multiwall bag manufacturing business of Hammond Bag & Paper co. Hammond will operate as a separate division retaining the same executive, sales and employee personnel, sales operations and services. The operations were obtained by Hudson in exchange for shares of Class A common stock.

A new corporation will be formed by Hammond shareholders to operate the paper board facilities not involved in the acquisition.

Krause Plow corp., Hutchinson, Kan., reports it has acquired exclusive manufacturing and sales rights for the Liberty liquid fertilizer hose pump. Ralph W. Dunlop, Krause sales vice president, said that sales of the pump will not be confined to the company's present dealers; they invite inquiries from all logical prospective dealers and liquid fertilizer applicators.

Charles A. Dillon has joined **Raymond Bag co.** as district representative. With headquarters in Houston, he will direct sales of the firm's multiwall paper shipping sacks in Texas, Louisiana and Arkansas.

Harold R. Krueger, formerly with Snyder Chemical co., has joined the sales staff of **Stedman Foundry and Machine co.**, as sales engineer in Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Ohio, Oklahoma, Tennessee, Texas, West Virginia and Mexico. He will make his headquarters in Stedman's home office in Aurora, Ind.

Stephens-Adamson Mfg. co.'s Standard Products div. has announced appointment of 13 authorized stocking distributors: J. R. Banbury Equipment co.; Southern Chemical Sales co.; P. J. Hagerty Equipment co.; Wisconsin Bearing co.; Buffalo Rubber & Supply co.; Dabney-Hoover Supply co.; The Harshberger Equipment co.; Eastern Engineering Sales co.; Stephens-Adamson Mfg. co.; Linder, Cox & co.; S-A Products co.; Langdon Supply co.; and Strong-Scott Mfg. co.

S-A says the Standard Products div. meets a growing need for its conveyor components on an "off the shelf" basis. In addition to these distributors, regional warehouses will be established to facilitate customer service.

FARM CHEMICALS

Plant Growth Compounds

US 2,708,624, issued May 17, 1955 to Frank E. Denny and assigned to Boyce Thompson Institute of Plant Research, inc., discloses the use of a class of phenolic ether compounds which have the property of delaying or inhibiting the growth of new plant tissue. The compounds are phenolic ethers of the group consisting of p-bromo-diphenyl ether, γ -bromopropyl phenyl ether, o-nitroanisole, o-nitrophenetole, ethyl anisate and iso-eugenol methyl ether. They may be applied to the plants in dispersed or diluted forms such as vapors, sprays or dusts.

Manufacture of Phosphonitrite Fertilizers

US 2,707,676, issued May 3, 1955 to Lucien Picot and Yves Martin, assigned to Societe Anonyme Des Manufactures des Glaces et Produits Chimiques de Saint-Gobain, describes a process for reacting phosphate fertilizers with nitric acid, in which the temperature is kept low enough to prevent loss of nitrogen and side reactions leading to the release of corrosive fluorides.

As shown in Fig. 1, a reaction tank (40) receives phosphate from a source (41), nitric acid from a source (42) and, if desired, sulfuric or phosphoric acid from a source (43). The reaction is strongly exothermic and the temperature is controlled by the va-

porization of ammonia from pipes (44 and 49) which extend with return bends close to the bottom of the tank and are supplied with liquid ammonia from a source (45). The ammonia vaporized in the pipes (44 and 49) passes to tanks (46 and 48) and is discharged into the reaction product from tank (40).

Alkali Phosphate Production

US 2,708,619, issued May 17, 1955 to Henry S. Winnicki and Charles P. Roberts, assigned to Food Machinery and Chemical corp., describes a process for the production of alkali metal phosphates such as sodium potassium, and ammonium phosphates.

The method involves burning phosphorus in a downwardly directed flame in the top of a vertical unlined steel reaction chamber to produce phosphorus pentoxide, and flowing an alkaline solution (e.g. sodium, potassium or ammonium hydroxide or carbonate) down along the inside walls of the reaction chamber. The phosphorus pentoxide reacts with the solution at 80 to 100°C. to produce alkali phosphate solution, which is removed at the bottom

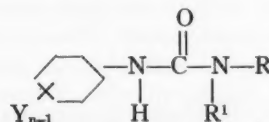
by Dr. Melvin Nord

PATENT REVIEWS

and sent to a crystallizer. The temperature of 80–100°C. is maintained within the tower by evaporation of water from the solution within the chamber.

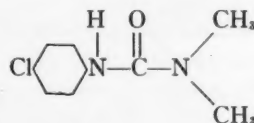
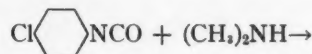
Solutions of Substituted Ureas in Monohydric Phenols as Herbicides

US 2,705,195, issued March 29, 1955 to Harold E. Cupery, Norman E. Searle and Charles W. Todd, and assigned to E. I. du Pont de Nemours & co., discloses an herbicidal composition consisting of a phenol solution of a urea having the formula

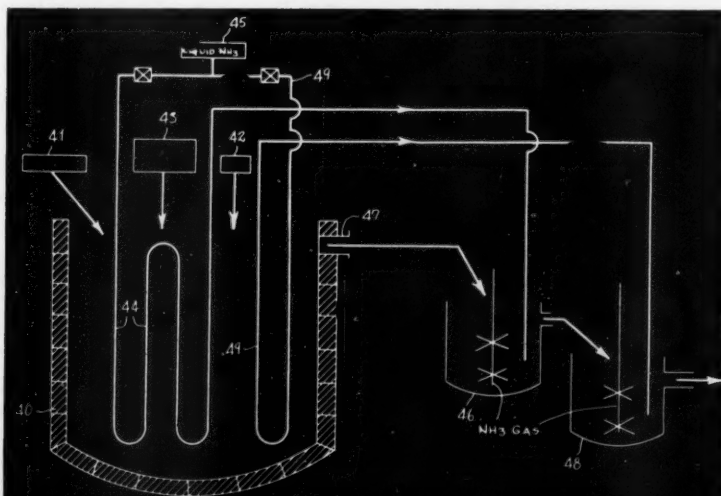


where Y is chlorine, bromine, nitro, or alkyl (up to 6 carbon atoms), n is an integer from 1 to 4, R is ethyl or methyl and R¹ is ethyl, methyl, or hydrogen.

As an example of a method of preparation:



This reaction can be carried out by adding the isocyanate to an inert solvent such as toluene at room temperature, followed by gradual addition of the amine. The reaction product crystallizes out on cooling the reaction product.





PEST REPORTS

*Presented in cooperation with
the Economic Insect Survey
Section, Plant Pest Control
Branch, Agricultural Research
Service, USDA.*

Potato Beetle

IN New Jersey during the latter part of June the Colorado potato beetle was worse on untreated potatoes and tomatoes than it was in 1954. This insect was also a problem on these crops in Delaware and was damaging tomatoes in Rockland county, N. Y. Damage to potatoes was also reported from northern Illinois as well as Yakima, Wash. More reports on abundance and destructiveness of the beetle were being received in Indiana than usual and Virginia was expecting damage to potatoes unless treatments were applied. Infestation was general but less than last year in the Red River valley of North Dakota. It is reported that DDT has not been effective in controlling this insect in this area again this year.

Pea Weevil

The adult pea weevil population was very heavy in the northern area of Idaho during late June, but there was very little vine growth of peas due to dry weather and it was possible that most of the weevils would die before depositing eggs. However, control operations were under way on the pest in the southern part of the State. Populations were higher than usual in Utah.

In early July the striped cucumber beetle was heavy in home gardens in the Newport and Wickford, R. I., areas. Populations up to 30 beetles per cucumber leaf were recorded. Lighter populations were common over the entire state. Moderately

heavy damage was recorded to cucumbers west of Dover, Del., and to watermelons at Canterbury, Del. Squash plants were severely damaged by the beetle in Allegany county, Md., and populations were quite heavy on vine crops in Westchester county, N. Y. Damage was reported to cucurbits in the Wahpeton area of North Dakota and moderate populations were occurring on melon plantings in the central area of Oklahoma.

Aphids

Aphids of various species were active in areas throughout the country. Potato aphids were increasing on tomatoes in Rockland county, N. Y., on potatoes in Saratoga county and on both crops in Wayne county. This aphid was heavy on tomatoes in eastern Nebraska counties and causing injury to that crop in the Kansas City, Mo., section. Treatment was necessary for tomatoes in the northern area of Illinois. Canning peas required control for the pea aphid in the Cache valley of Utah, in central and south Minnesota where the populations were heavier than in the past several years. Cannery in Minnesota report more than normal respraying necessary to control the insect.

The green peach aphid which caused economic damage to tobacco for the first time in 1947 is reported heavy on that crop in several areas. In the Clarksville area of Tennessee, infestations are the most severe since 1950. In that area dark fire-cured to-

bacco was more heavily infested than burley. In many fields of Florence county, S. C., populations were unusually high and some heavy infestations were reported from Pittsylvania county, Va. In North Carolina, however, predators were instrumental in markedly reducing populations of the aphid.

Boll Weevil Activity

Boll weevil activity in Texas during late June and early July was ahead of the period last year. Hibernation cage tests at Waco, Tex., to June 24, showed a weevil survival of 10.9 as compared to 2.9 on the same date in 1954. By early July there was a slight increase in boll weevil population in the upper-coastal and south-central Texas areas, but for the time of year populations were extremely heavy in the central, north central, west cross timbers, east and northeast areas. In the lower Rio Grande valley, losses in some fields where controls were begun late or improperly applied, exceeded 57 per cent.

Up to July 1 infestations were fairly light in Oklahoma. To that time, the heaviest infestation was 24 per cent punctured squares in one Choctaw county field. Since that date infestations have been on the increase. Early populations were relatively light in Arkansas, but by the early part of June some insecticides were needed.

In the Tallulah, La., area, all 91 fields examined were infested with punctured squares averaging 9 per cent. Other Louisiana parishes reporting punctured square averages were: Red River, two fields, 12 per cent; Bossier, three fields, 41 per cent; Ouachita,

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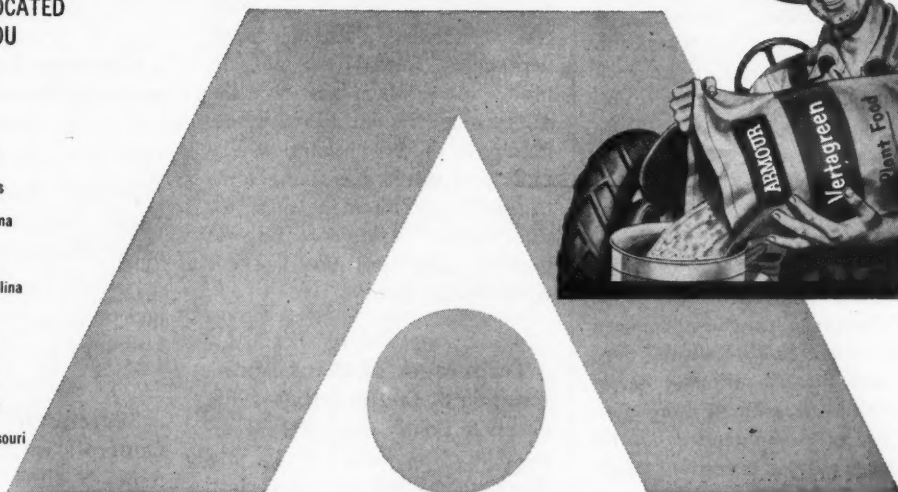
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East St. Louis, Illinois
Greensboro, North Carolina
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five fields, 21 per cent and Tensas, five fields, 14 per cent.

Counts in Tennessee during early July were low. The same was true in Mississippi but activity appeared to be increasing. In southeastern Alabama of 43 fields examined 38 were found infested with an average of 5.4 per cent. Untreated fields examined in middle and south Georgia showed an average of 11 per cent punctured squares with all fields examined infested. At Florence, S. C., cage survival to July 1 was above the 24 year average, being 5.8 per cent compared to 3.6. Total weevils taken in a trap plot to June 30 was 1521 compared with 76 to the same date in 1954. Of 177 fields surveyed in North Carolina, 45 were found to be free from boll weevils, approximately 85 had less than 10 per cent infestation and the remainder 10 per cent or more.

Activity of other cotton insects has been relatively light to date.

Alfalfa Weevil

The alfalfa weevil which previously had been reported from the adjacent states of South Dakota and Montana and the Province of Saskatchewan, Canada, has now been found in North Dakota. In a survey made during the week of June 20, specimens were collected in Adams, Bowman, Slope and Stark counties. All infestations found were in trace amounts.

European Corn Borer

The European corn borer problem continues to cause concern in some states. Controls were well under way in Illinois, and in Iowa there was much more general use of recommended control practices than in preceding years. Southwestern Kentucky counties appeared to have the heaviest European corn borer infestation since 1950-51. The insect was more abundant in the Clarksville, Tenn., area than for some years. ▲

Literature

Chemistry of the Pesticides, 3rd edition. Donald E. H. Frear, \$8.00.

A new revision of a well known reference, extensively revised to include new discoveries in pest control. Coverage of rodenticides is now provided.

Chapters have been rearranged to permit a discussion of the more important organic compounds followed by inorganic materials. Analytical procedures are provided with the discussion of each individual pesticide.

Orders for this book are handled promptly through FARM CHEMICALS' Book Service department. Send check or money order to: FARM CHEMICALS, 317 N. Broad St., Philadelphia 7, Pa.

1955 Occupational Safety Services Guide 2.1. National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. 68 pages. Individual copies sent free of charge.

A complete catalog listing the wide variety of accident prevention aids available from the council. Included is a list of council periodicals, newsletters and library of publications for the safety man; a monthly magazine, hundreds of five minute safety talks and selected training films to assist the foreman; and, for the worker, a diverse line of posters, films and booklets designed to sell safety.

Techniques of Plant Maintenance & Engineering—1955. Clapp & Poliak, Inc., 341 Madison Ave., New York City 17. 218 pages, charts and diagrams, cloth bound. \$7.50.

A report on proceedings of the annual conference held concurrently with the Plant Maintenance & Engineering Show. In-

cludes 23 prepared papers, summaries of 16 round tables and text of questions presented to the 56 participating industrial experts.

Anhydrous Ammonia, Ammonium Nitrate and Solutions of Nitrogenous Fertilizers. W. B. Andrews, State College, Miss. 36 pages. \$0.50, single copies.

A reprint of Chapter 2 in Dr. Andrews' "The Response of Crops and Soils to Fertilizers and Manures, 1954." Contains a summary of comparative information on NH_3 and ammonium nitrate with data on ammonium nitrate in solution and analysis of information on other nitrogenous fertilizers in solution.

American Management Association, 330 W. 42nd St., New York 18, N. Y.:

Tested Approaches to Cutting Production Costs, Special Report No. 4. 125 pages. \$3.75.

Taken from material presented at a recent special manufacturing conference showing executives how to determine whether and when costs are out of line.

Company Experience in Improving Office Administration. Office Management Series No. 137. 56 pages. \$1.75.

Includes discussion of increased office productivity, papers on office administration for improving service to sales management and on programming a new office building.

Searchlight on Office Cost Control. Office Management Series No. 138. 48 pages. \$1.75.

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FARM CHEMICALS

FERTILIZER MATERIALS MARKET

New York

July 12, 1955

Sulfate of Ammonia. In spite of the fact that the price was reduced July 1 by most producers, the movement is said not to be up to expectations. A considerable amount of export inquiry was in the market but little definite business actually was booked.

Nitrate of Soda. A routine affair is reported in nitrate of soda but stocks are available at various ports.

Ammonium Nitrate. Several producers reduced prices for prompt shipment of about \$3 per ton which has helped move some stocks.

Urea. Little trading was reported, few foreign offerings are being made and the market is quiet.

Nitrogenous Tankage. Limited sales are being made for prompt shipment with no price changes noted and last sales on the basis of \$4.10 to \$5.10 per unit of ammonia (\$4.98 to \$6.20 per unit N), according to shipping points.

Castor Pomace. Last sales made on the basis of \$37.50 per ton, f.o.b. production points, with stocks limited.

Organics. Trading in organic fertilizer materials was rather slow for the past two weeks as most buyers remained out of the market to get a clearer picture of their business. Some trading was done in tankage and blood at prices ranging from \$4.50 to \$5 (\$5.47 to \$6.08 per unit N), on tankage, f.o.b. Eastern points and on blood from \$5.25 to \$5.50 (\$6.38 to \$6.68 per unit N) f.o.b. production points. Soybean meal advanced from \$48 to \$52 per ton in bulk, f.o.b. Decatur, Ill., with interest coming mainly from the feed industry. Cottonseed meal was steady at about \$60 per ton,

AUGUST, 1955

f.o.b. Memphis, Tenn. Linseed meal was quoted at \$63 per ton, f.o.b. Buffalo, N. Y., for prompt and \$1.50 per ton cheaper for future delivery.

Fish Meal. Operations of the fishing fleet were in full swing but the catch was reported better in Southern waters than in the North. Some sales of scrap were reported at \$130 per ton, f.o.b. fish factories, with quantities available rather limited.

Bone Meal. Prices eased off slightly in the last few weeks and while \$67.50 per ton was asked for fertilizer and feeding bone meal, few sales were being made. However, supplies are light and not pressing on the market. A better market is looked for in a few weeks.

Hoof Meal. Last sales were made on the basis of \$6.25 per unit of ammonia (\$7.59 per unit N), f.o.b. Chicago.

Superphosphate. Because of the various strikes at the phosphate rock mines in Florida, production of superphosphate was being hampered at certain points and some producers were forced to shut down. While no great shortage of the material is expected for the present, most buyers were watching the situation.

Potash. Producers were maintaining present prices but orders were said to be smaller than at this time last year, and shipments were also being made on a limited basis. Very little imported potash was being offered.

Philadelphia

July 12, 1955

The market in materials remains quiet. The price trend for some of the various forms of nitrogen is rather downward. Blood and tankage are in somewhat better favor. Bone meal is softer.

Sulfate of Ammonia. Prices remain unchanged and steady, with stocks plentiful. Production is considerably ahead of last year.

Nitrate of Ammonia. Production is greater than last year and the supply is reported large. A Canadian producer is reported reducing price \$4.50 per ton down to \$70, f.o.b. shipping point.

Nitrate of Soda. Movement is seasonally quiet. There are sufficient stocks to meet all demands and no price changes are indicated.

Anhydrous Ammonia. This has enjoyed a good season for direct application, with demand tapering off. The supply is quite sufficient and price revision to \$85 per ton in tank cars is reported.

Blood, Tankage, Bone. Blood and tankage are presently firmer at \$4.75 to \$5.50 per unit of ammonia (\$5.77 to \$6.68 per unit N), depending on location. Bone meal is easier at \$65 to \$67.50 per ton. Nitrogenous tankage is in limited supply at \$4.25 to \$4.50 per unit of ammonia (\$5.16 to \$5.47 per unit N).

Fish Scrap. Demand not too active and market about \$128 per ton for scrap and \$133 for menhaden meal.

Phosphate Rock. Strike at the mines, affecting some seven plants, continues. However, as inventories have been rather large, it is possible to make deliveries in fair volume.

Superphosphate. Shipments are moving at a satisfactory rate regardless of the strike at the rock mines. Both normal and triple grades are said to be in sufficient abundance to take care of all inquiries.

Potash. Movement which was quite active before July 1, has now quieted down to normalcy. Prices remain undisturbed.

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Chemical or Mechanical Engineer. For maintenance and project work, agricultural chemical processing; age 21-30; St. Louis area. Applicant must be congenial, energetic and willing to accept future and additional responsibilities of supervisory and administrative nature. Employee benefits. Pleasant employer relationship. State salary requirement and qualifications. Address "505," care FARM CHEMICALS, Philadelphia 7, Pa.

Statistics

Pesticide Output

Shows Gain in 1954

Production of pesticides and other organic agricultural chemicals during 1954 totaled 419 million pounds, an increase of 18 per cent over the previous year, ac-

cording to a Tariff Commission report. Sales were 336 million pounds valued at \$124 million compared to 334 million pounds and \$119 million for 1953.

Cyclic pesticides accounted for 357 million pounds of the total production, 279 million pounds of sales and \$102 million of the total value. Figures for 1953 were 297 million, 282 million and \$99 respectively. DDT was produced in the greatest quantity with an output of 97 million pounds recorded.

Another report shows that production of surface active agents reached 1,026 million pounds, up 11 per cent over 1953. Sales amounted to 913 million pounds valued at \$196 million, well above the 1953 figures of 732 million pounds and \$145 million.

Production of anionic surfactants in 1954 totaled 831 million pounds, about 80 per cent of total output.

Output of cyclic surfactants totaled 640 million pounds and

sales 577 million valued at \$120 million.

Super Production

Climb Continues

Superphosphate production for April totaled 234,104 tons (100 per cent APA), up 2 per cent from March and 6 per cent over April, 1954. Shipments of all grades amounted to 189,645 tons, down 4 per cent and up 20 per cent respectively.

Stocks on hand at the end of the month were 19 per cent less than those held on April 1 but 18 per cent more than the quantities on hand April 30, 1954.

NH₃ Output Record

A new record monthly production high is reported by the U. S. Department of Commerce for synthetic anhydrous ammonia output during April. Production reached 285,760 tons, over 500 tons higher than the previous month.

Production — April, 1955

Compiled from Government Sources

Chemical	Unit	April		March
		1955	1954	1955
Ammonia, synth. anhydrous.....	s. tons	285,760	232,246	285,239
Ammonia liquor, coal & coke (NH ₃ content).....	pounds	3,431,667	3,503,535	3,056,935
Ammonium nitrate, fert. grade (100% NH ₄ NO ₃).....	s. tons	148,259	125,457	158,285
Ammonium sulfate				
synthetic (technical).....	s. tons	90,042	78,233	115,606
coke oven by-product.....	pounds	171,251,310	130,921,736	166,258,291
BHC (Hexachlorocyclohexane).....	pounds	4,474,399	7,236,610	3,045,914
Gamma content.....	pounds	889,625	1,121,398	547,354
Copper sulfate (gross).....	s. tons	6,496	6,852	6,904
DDT.....	pounds	9,216,134	8,750,416	10,456,387
2,4-D Acid.....	pounds	3,142,302	2,863,249	3,314,507
esters & salts.....	pounds	**3,080,596	2,134,181	2,807,512
esters & salts (acid equiv.).....	pounds	**2,320,752	1,648,712	2,098,813
Phosphoric acid (50% H ₃ PO ₄).....	s. tons	312,059	264,979	312,208
Sulfur, Native (Frasch).....	l. tons	437,738	445,158	434,568
Recovered.....	l. tons	32,700	31,000	33,700
Sulfuric acid, gross (100% H ₂ SO ₄).....	s. tons	¹ 1,339,115	1,193,680	1,387,831
Chamber process (100% H ₂ SO ₄).....	s. tons	198,247	228,234	237,186
Contact process (100% H ₂ SO ₄).....	s. tons	¹ 1,140,868	965,446	1,150,645
Superphosphate (100% APA).....	s. tons	234,104	220,418	228,764
Normal (100% APA).....	s. tons	158,451	176,915	158,555
Enriched (100% APA).....	s. tons	5,344	—	4,164
Concentrated (100% APA).....	s. tons	68,990	42,594	65,286
Wet Base (100% APA).....	s. tons	1,319	909	759
2,4,5-T Acid.....	pounds	—	—	207,464

* Revised.

** Partly estimated.

¹ Includes quantities for 2 plants previously not reporting.

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Dictionary of Fertilizer Materials & Terms \$1.00 postpaid

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Costa Rican President Figueres throws the switch to officially start production at the plant. Watching are Bruce Masis, minister of agriculture and industry and H. P. McKenna, engineer in charge of construction.

Open Costa Rica Pesticide Unit

A NEW South-of-the Border market for U. S. producers of technical pesticide materials was opened recently with the dedication of a large insecticide plant at San Antonio De Belen, Costa Rica. Erected by Quimicas Agricolas Centro-Americanas, Ltda. (Quimagra), the unit will produce 70 to 150 formulations for a variety of technical concentrates, selling them under the Quimagra label throughout Central America.

Management of the new pest control operation feels that memories of insect invasions such as that of the grasshopper in 1949 are sufficiently vivid that local farmers will be quick to see the importance of such products. The plant has been designed so that emergency control situations can be handled without loss of time.

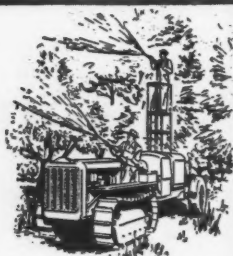
Engineers from the U. S. assisted local businessmen in setting up the facilities, and Channing J. Fredrickson, former export manager for John Powell & co., is the chief operating executive with control over all activities including production, marketing and sales. A Purdue graduate with major in entomology, he also worked with Niagara Sprayer and Chemical co., as a research supervisor.

Formulations are pre-mixed, then introduced into a Raymond roller mill said to be the only one of its kind in Central America. U. S. firms are expected to constitute the major source of technical materials which now include DDT, toxaphene, BHC, aldrin, dieldrin and heptachlor. ▲

SPRAYING SYSTEMS

GunJet®

SPRAY GUNS



**dependable
performance
at all
pressures**

For effective spraying at any pressure from 30 to 800 pounds. Ruggedly built. Adjustable from straight stream to cone spray. Long life tips. Balanced for easier handling. Built by the makers of TeeJet Spray Nozzles. Write for Bulletin No. 65.

SPRAYING SYSTEMS CO.

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HIGHEST PROFITS!**

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Trade Mark Reg.

Patent Pending

THE ALL-PURPOSE LIQUID FERTILIZER

Complete with penetrating agent—trace elements
—plant growth stimulants

**NEW ADVANCED LIQUID FERTILIZER
WITH THE
10-20-10 FORMULA—40% NUTRIENTS**

OTHER OUTSTANDING FERTI-LIQUID FEATURES

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② **PERMANENTLY SEALED** . . . precision ball bearings are protected by a die-cast double labyrinth seal which will not corrode or wear, insuring protection of bearings from dirt and moisture.

③ **PRE-LUBRICATED** . . . sufficient grease is sealed into each roller to last the normal life of the carrier—Alemit fittings also provide for easy re-lubrication.

④ **INTERCHANGEABLE ROLLERS** . . . pre-adjusted 4" diameter rollers slide easily in or out of the hex-slots in the supporting brackets without tools.

Drawing shows spun end roller construction, die-cast labyrinth seals and precision ball bearings in position.

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DELIVERY!**

WRITE FOR CATALOG 554

STANDARD PRODUCTS DIVISION

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MFG. CO.

75 Ridgeway Ave.

Aurora, Illinois

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AUGUST, 1955

65

Pesticide Research

PESTICIDE producers received some excellent advice from Dr. George C. Decker, Illinois Natural History Survey, at the recent meeting of Western Agricultural Chemical Association.

He pointed out that it seems probable industry must continue to foot most of the bill for development of new pesticides, principally because of taxpayer reaction to profit motives. These five suggestions were presented to firms interested in pesticide development:

1. Recognize that an investment of one-half to one and one-half million dollars is needed to bring a product to the registration and tolerance establishment stage.

2. Establish at an early date a product's unique advantages or disadvantages; determine the value of its development; find the greatest potential uses or markets and exploit these before attempting to develop others; carefully list data requirements and develop a research program that will provide the desired information at a minimum cost and with a minimum of inconvenience to cooperators.

3. Recognize that public and private research agencies are primarily interested in developing a material that will fill some obvious void, but will give little interest to new materials no better than those now available, so long as other problems demand prior consideration.

4. Establish new uses as rapidly as possible, once a material has reached the market stage.

5. The limited facilities of most laboratories are largely committed to definite lines of well planned research and can normally undertake only limited additional studies, often only those conveniently fitted into the existing work program.

FOR maximum cooperation from other agencies, Decker suggests that a sound program be worked out well in advance providing the exact information to be obtained and locations of possible cooperators who can develop various segments of the project, supplying each cooperator with the material needed to assume a reasonable prospect of success.

He commented on the needless wasting of effort caused by firms that present materials for testing which turn out to have little or no value or which

differ very considerably in one respect or another from the findings reported by the company. Such experiences do not aid good relations between agencies, he continued, and can lead to an attitude of "test your own products and bring me the data," a situation that can foster many ills.

This is not the only way in which the time and efforts of researchers can be wasted. Decker points out several areas of consideration that would help to reduce research costs:

Overcoming hesitancy of workers to accept findings of others without duplicate lab tests and/or field plots of their own. Such repetition dilutes the research effort and tends to minimize the number of larger and more worthwhile projects that could be tried.

Getting rid of "an unrealistic demand for immediate answers;" use hit-or-miss studies sparingly, principally to obtain data which may be needed prerequisite to development of a sound research program.

Using some semi-basic research on evaluation of methods and experimental procedures would pay big dividends.

Closer liaison and exchange of preliminary data and ideas with early publication of preliminary results. Negative results and details of studies pursued in development of techniques and methods are too often omitted in publications.

THE agricultural agency researcher can aid through careful selection of cooperators and might often obtain desired data or materials as a by-product of research contemplated or already in progress. For example, performance data on various crops and for various insects could be obtained, information on phytotoxicity and other adverse effects, samples could be collected for off-flavor studies and for residue determinations.

Industry, of course, will be primarily interested in discovery, development and sale of pesticides, continued Decker, retaining an interest in basic research but undertaking or financing the latter work in limited means except where there is a direct sales relationship.

On the other hand, he said, government agencies "must maintain broad, fundamental interests and strive to develop the most effective and economical pest control procedures obtainable, whether they be cultural, biological or chemical."

G. P. T., JR.

Editor

FARM CHEMICALS

Buyers' Guide

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Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

AMMONIA—Anhydrous and Liquor

Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Escambia Bay Chem. Corp., Pensacola, Fla.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Lion Oil Co., El Dorado, Ark.
Mississippi River Chem. Co., St. Louis, Mo.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
U. S. Industrial Chemicals, New York City

AMMONIA APPLICATORS

KBH Corp., Clarksdale, Miss.

AMMONIA CONVERTER

J. C. Carlie, Corp., Denver, Colo.

AMMONIUM NITRATE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Escambia Bay Chem. Corp., Pensacola, Fla.
Lion Oil Co., El Dorado, Ark.
Mississippi River Chem. Co., St. Louis, Mo.
Phillips Chemical Co., Bartlesville, Okla.

AMMONIUM PHOSPHATE

Monsanto Chem. Co., St. Louis, Mo.

AMMONIUM SULFATE

See Sulfate of Ammonia

BAGS—BURLAP

Chase Bag Co., Chicago, Ill.

BAGS—COTTON

Chase Bag Co., Chicago, Ill.

BAGS—Multiwall—Paper

Chase Bag Co., Chicago, Ill.
International Paper Co., Bagpak Div., N. Y. C.
Hammond Bag & Paper Co., Wellsburg, W. Va.
Kraft Bag Corporation, New York City
Union Bag & Paper Corp., New York City

BAGS—Dealers and Brokers

Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES

International Paper Co., Bagpak Div., N. Y. C.

BAG PRINTING MACHINES

Schmutz Mfg., Louisville, Ky.

BAG FILLING MACHINES

E. D. Coddington Mfg. Co., Milwaukee, Wisc.
Stedman Foundry and Machine Co., Aurora, Ind.
Union Bag & Paper Corp., New York City

BHC AND LINDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pennsylvania Salt Mfg. Co., of Wash., Tacoma, Wash.

BIN LEVEL CONTROLS

Stephens-Adamson Mfg. Co., Aurora, Ill.

BIN DISCHARGERS

Stephens-Adamson Mfg. Co., Aurora, Ill.

BONE PRODUCTS

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackie, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID

American Potash & Chemical Corp., Los Angeles, California
Woodward & Dickerson, Inc., Philadelphia, Pa.

BOX CAR LOADERS

Stephens-Adamson Mfg. Co., Aurora, Ill.

BROKERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackie, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BULK TRANSPORTS

Highway Equipment Co., Cedar Rapids, Ia.

CALCIUM ARSENATE

American Agricultural Chemical Co., N. Y. C.

CAR PULLERS

Stephens-Adamson Mfg. Co., Aurora, Ill.

CARS AND CART

Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

CASTOR POMACE

Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

CHEMISTS AND ASSAYERS

Shuey & Co., Inc., Savannah, Ga.

CHLORDANE

Ashcraft-Wilkinson Co., Atlanta, Ga.

CLAY

Ashcraft-Wilkinson Co., Atlanta, Ga.

CONDITIONERS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackie, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

CONVEYORS

Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sturtevant Mill Co., Boston, Mass.

COPPER SULFATE

Tennessee Corp., Atlanta, Ga.

COTTONSEED PRODUCTS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackie, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

CUSTOM PESTICIDE FORMULATION

Barco Chemicals, Inc., Des Moines, Ia.

DDT

Ashcraft-Wilkinson Co., Atlanta, Ga.

DIELDRIN

Ashcraft-Wilkinson Co., Atlanta, Ga.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

DILUENTS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.
Summit Mining Corp., Carlisle, Pa.
Thomas Alabama Kaolin Co., Baltimore, Md.

DITHIOCARBAMATES

Berkshire Chemicals, New York City

DUST APPLICATORS

Raw Materials Trading Co., New York City

ELEVATORS

Power-Curve Conveyor Co., Denver, Colo.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.

ENDRIN

Shell Chemical Co., Agr. Chem. Div., Denver, Colo.

ENGINEERS—Chemical and Industrial

Chemical Construction Corp., New York City
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

FERTILIZER—Liquid

Clover Chemical Co., Pittsburgh, Pa.

FERTILIZER—Mixed

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.

FILLERS

Bradley & Baker, N. Y. C.

FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackie, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH

Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES

American Agricultural Chemical Co., N. Y. C.
Berkshire Chemicals, New York City
Metalsalts Corp., Hawthorne, N. J.
Tennessee Corp., Atlanta, Ga.

HERBICIDES

American Potash & Chemical Corp., Los Angeles, California
Barco Chemicals, Inc., Des Moines, Ia.
Lion Oil Company, El Dorado, Ark.

HERBICIDES—Oils

Lion Oil Company, El Dorado, Ark.

HOPPERS & SPOUTS

Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES

American Agricultural Chemical Co., N. Y. C.
American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., Atlanta, Ga.
Barco Chemicals, Inc., Des Moines, Ia.
Berkshire Chemicals, New York City
Fairfield Chem. Div., Food Mach. & Chem. Corp., New York City
Pennsylvania Salt Mfg. Co., of Wash., Tacoma, Wash.
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

IRON SULFATE

Tennessee Corp., Atlanta, Ga.

KAOLIN

Thomas Alabama Kaolin Co., Baltimore, Md.

LEAD ARSENATE

American Agricultural Chemical Co., N. Y. C.

LIMESTONE

American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
National Lime & Stone Co., Findlay, Ohio

MACHINERY—Acid Making and Handling

Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Acidulating

Chemical Construction Corp., New York City
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Grinding and Pulverizing

Bradley Pulverizer Co., Allentown, Pa.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

Buyers' Guide

MACHINERY—Material Handling

Clark Equip. Co., Construction Mach. Div., Benton Harbor, Mich.
Hough, The Frank G. Co., Libertyville, Ill.
Jaeger Machine Co., Columbus, O.
Link-Belt Co., Chicago, Ill.
Poulsen Co., Los Angeles, Calif.
Power-Curve Conveyor Co., Denver, Colo.
Sauerman Bros. Inc., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Mixing and Blending

Munson Mill Mach. Co., Utica, N. Y.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Mixing, Screening and Bagging

Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Power Transmission

Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY

Superphosphate Manufacturing

Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MAGNESIUM SULFATE

Berkshire Chemicals, New York City

MANGANESE SULFATE

Tennessee Corp., Atlanta, Ga.

MANURE SALTS

Potash Co. of America, Washington, D. C.

MINOR ELEMENTS

Tennessee Corporation, Atlanta, Ga.

MIXERS

Munson Mill Mach. Co., Utica, N. Y.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

NITRATE OF POTASH

Berkshire Chemicals, New York City

NITRATE OF SODA

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
McIver & Son, Alex. M., Charleston, S. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS

Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Escambia Bay Chem. Corp., Pensacola, Fla.
Mississippi River Chem. Co., St. Louis, Mo.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.

NITROGEN MATERIALS—Organic

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Smith Rowland Co., Norfolk, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

ORGANIC MERCURY COMPOUNDS

Metalsalts Corp., Hawthorne, N. J.

PARATHION

Ashcraft-Wilkinson Co., Atlanta, Ga.

PHOSPHATE ROCK

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID

American Agricultural Chemical Co., N. Y. C.

PLANT CONSTRUCTION—Fertilizer and Acid

Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

POTASH—Muriate

American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
Bradley & Baker, N. Y. C.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, Washington, D. C.
Southwest Potash Corporation, New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate

American Potash & Chemical Corp., Los Angeles, California
International Min. & Chem. Corp., Chicago, Ill.
Potash Co. of America, Washington, D. C.

PRINTING PRESSES—Bag

Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

REPAIR PARTS AND CASTINGS

Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

SCALES—Including Automatic Baggers

Atlanta Utility Works, The, East Point, Ga.
Stedman Foundry and Machine Co., Aurora, Ind.

SCRAPER MACHINES

Sauerman Bros., Inc., Chicago, Ill.

SCREENS

Atlanta Utility Works, The, East Point, Ga.
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

SEPARATORS, AIR

Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

SHOVEL LOADERS

Clark Equip. Co., Benton Harbor, Mich.
Hough, The Frank G. Co., Libertyville, Ill.
Jaeger Machine Co., Columbus, O.

SOLVENTS

Crowley Tar Products Co., New York City
Richfield Oil Corp., Los Angeles, Calif.

SPRAYS

Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

SPREADERS, TRUCK

Highway Equipment Co., Cedar Rapids, Ia.

STORAGE BUILDINGS

Butler Manufacturing Co., Kansas City, Mo.

STORAGE TANKS

Broadway Rubber Corp., Louisville, Ky.
Butler Manufacturing Co., Kansas City, Mo.
Cole, R. D., Manufacturing Co., Newnan, Ga.

SULFATE OF AMMONIA

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.

Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA

International Min. & Chem. Corp., Chicago, Ill.

SULFUR

Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying

Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC

Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TANKS—NH₃ and Liquid N

Broadway Rubber Corp., Louisville, Ky.
Butler Manufacturing Co., Kansas City, Mo.
Cole, R. D. Manufacturing Co., Newnan, Ga.
KBH Corporation, Clarksdale, Miss.

TOXAPHENE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Coke & Chem. Co., Agr. Chem. Div., Pittsburgh, Pa.

TRUCKS—SPREADER

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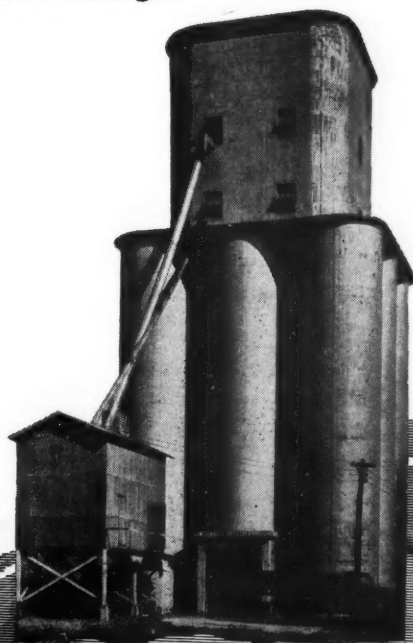
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